

# JOURNAL

OF THE

## ASIATIC SOCIETY OF BENGAL.

VOL. LXXIV., PART II.—Extra Number, 1907.

LIBRARY  
NEW YORK  
BOTANICAL  
GARDEN

*Materials for a Flora of the Malayan Peninsula.*—By SIR GEORGE KING, K.C.I.E., LL.D., F.R.S., late Superintendent of the Royal Botanic Garden, Calcutta, and J. SYKES GAMBLE, C.I.E., F.R.S., late of the Indian Forest Department.

No. 19.

This part contains three Families, Nos. 75 *Apocynaceæ* and 76 *Asclepiadaceæ*, both done by Mr. Gamble, with No. 77 *Loganiaceæ*, done by Sir G. King, with the exception of the genus *Strychnos*, contributed by Mr. Gamble.

The 3 Families comprise 86 genera and 234 species. There are 2 new genera and 70 new species.

### Family LXXV.—APOCYNACEÆ.

Trees or erect or climbing shrubs, rarely herbs; more or less laticiferous. *Leaves* simple, generally opposite, sometimes whorled, rarely alternate or scattered, entire, penninerved; stipules none or represented by interpetiolar ridges or glands. *Inflorescence* generally of terminal or pseudo-terminal or axillary cymes which are solitary or clustered in 2- or 3-chotomous panicles, corymbs or pseudo-umbels; bracts usually small and caducous; flowers small to large, often showy, hermaphrodite, regular. *Calyx* inferior; tube usually very short; lobes 5, imbricate, often with (usually scale-like) glands inside near the base. *Corolla* gamopetalous, salver-shaped or funnel-shaped, rarely campanulate urceolate or subglobose, often with scales or a ring or protuberances in the mouth of the tube; lobes 5 (rarely 4), spreading, often contorted or twisted in bud, rarely valvate, overlapping to the right or left (as seen from outside). *Stamens* 5, rarely 4, alternate with the corolla-lobes, inserted in the corolla-tube or on its mouth; filaments short, often decurrent in

ridges inside the tube; anthers linear-oblong or sagittate, free or connivent in a cone and adhering to the stigma by the connective; cells 2, longitudinally dehiscent, sometimes produced at the base in barren spurs; pollen granular, usually spherical, with 3 pores or 2 to 3 rounded protuberances. *Disk* none, or annular or cupular, or reduced to 2 to 5 scales or glands. *Ovary* superior, free or somewhat adnate to the disk, 1-celled with 2 parietal placentas, or 2-celled with axile placentas, or of 2 distinct or partially connate carpels; ovules in each cell 2 or few or many and 2- to  $\infty$ -seriate, rarely solitary, anatropous, usually pendulous; style 1, entire or divided at the base; stigma various, usually ending in a bifid apiculus and frequently with a ring or other appendages, often viscous. *Fruit* a dry or fleshy drupe, berry or samara, or of two baccate or follicular mericarps. *Seeds* various, often compressed, sometimes winged, sometimes with a tuft of hairs at one or both ends; testa coriaceous, crustaceous or membranous; albumen hard, fleshy or scanty or none; embryo straight; cotyledons flat, concave, convolute or contorted; radicle superior.—**DISTRIB.** Chiefly tropical; genera about 110 to 120; species probably about 1000, or even more.

Anthers included, free from the stigma, cells rounded at the base; corolla-lobes usually overlapping to the left:—

Ovary of 2 wholly combined carpels, 1-2-celled; fruit large, usually fleshy or pulpy within; seeds without wing or pencil of hairs (coma) (Tribe I. *CARISSEÆ*):—

Ovary 1-celled, with parietal ovules:—

- |                                 |    |    |                 |
|---------------------------------|----|----|-----------------|
| Fruit indehiscent; albumen none | .. | .. | 1. WILLUGHBEIA. |
| Fruit 2-valved; albumen present | .. | .. | 2. CHILOCARPUS. |

Ovary 2-celled, with axile ovules:—

- |   |                     |
|---|---------------------|
| Flowers 4-merous; albumen none; corolla-throat naked                | 3. LEUCONOTIS.      |
| Flowers 5-merous; albumen present; corolla-throat with lobed scales | .. .. 4. MELODINUS. |

Ovary of 2 distinct carpels, united by the style; fruit various, seeds peltate (Tribe II. *PLUMERIÆ*):—

Calyx eglandular within; carpels 1-2-, rarely 4-6-ovuled; fruit of 2 1-seeded drupes or berries, rarely moniliform (Subtribe 1. *RAUWOLFIINÆ*):—

Leaves usually whorled:—

- |  |       |               |
|--|-------|---------------|
| Albumen ruminant; erect or climbing shrubs with more or less coriaceous leaves | .. .. | 5. ALYXIA.    |
| Albumen even; erect shrubs with fleshy or soft leaves, membranous when dry     | .. .. | 6. RAUWOLFIA. |
| Leaves opposite; disk none; albumen smooth                                     | .. .. | 7. HUNTERIA.  |

Calyx glandular within:—

Carpels 2-, rarely 4-ovuled, ovules on opposite sides of a thick placenta; fruit a 1- or 2-seeded drupe or berry (Subtribe 2. *CERBERINÆ*):—



Leaves alternate or scattered; corolla funnel-shaped, large, lobes overlapping to left; fruit drupaceous, over 2 in. long .. .. . 8. *CERBERA*.

Leaves opposite or whorled; corolla hypocrateriform, lobes overlapping to right:—

Leaves usually whorled, fleshy when green, membranous when dry; fruit drupaceous, over 2 in. long .. 9. *OCHROSIA*.

Leaves opposite, membranous to subcoriaceous; fruit capsular, angled .. .. . 10. *KOPSIA*.

Carpels 6- $\infty$ -ovuled; fruit of 2 follicular mericarps (Subtribe 3. *EUPLUMERINÆ*):—

Leaves in whorls, main-nerves prominent; cotyledons flat:—

Follicles slender, long, cylindric; seeds small, oblong, with tufts of hair at the ends; style filiform; stamens usually near the top of the tube .. 11. *ALSTONIA*.

Follicles very large, stout; seeds large, with a membranous wing; style none or minute; stamens usually at the middle of the tube .. .. 12. *DYERA*.

Leaves opposite:—

Follicles slender, with comose seeds; style short; cotyledons complicate .. .. 13. *HOLARRHENA*.

Follicles stout, short, with arillate non-comose seeds; style filiform; cotyledons flat .. .. 14. *ERVATAMIA*.

Anthers included or exserted, conniving in a cone around the top of the style and adherent to the stigma by a point on the connective, cells produced downwards into empty spurs; ovary of 2 distinct rarely connate carpels united by the style; fruit of 2 follicular mericarps; seeds comose at one or both ends (Tribe III. *ECHITIDÆ*):—

Anthers more or less exserted (Subtribe 1. *PARSONSIINÆ*):—

Corolla-lobes valvate; carpels connate in flower .. 15. *PARSONSIA*.

Corolla-lobes imbricate; carpels separate:—

Corolla-throat naked; cotyledons flat:—

Corolla rotate; connective of anthers thickened at back .. .. 16. *VALLARIS*.

Corolla hypocrateriform; connective not thickened .. 17. *POTTSIA*.

Corolla-throat usually with scales, rotate or hypocrateriform; cotyledons convolute .. .. 18. *WRIGHTIA*.

Anthers included:—

Corolla-throat with 5-10 scales (Subtribe 2. *NERINÆ*):—

Corolla-lobes long or tailed .. .. 19. *STROPHANTHUS*.

Corolla-throat naked (Subtribe 3. *ECHITIDINÆ*):—

Corolla-lobes valvate or overlapping to the left:—

Corolla-lobes valvate, tube urceolate; flowers minute.. 20. *URCEOLA*.

Corolla-lobes overlapping to left, tube subcampanulate; flowers small .. .. 21. *PARAMERIA*.

Corolla-lobes imbricate, overlapping to the right:—

Corolla minute, urceolate, lobes scarcely twisted to left in bud .. .. 22. *ECDYSANTHERA*.

Corolla hypocrateriform, lobes twisted to left in bud:—

Seeds beaked:—

Lobes of corolla not markedly spiral in bud; beak of seed with tufted coma:—

Albumen of seed present; flowers, leaves and follicles very large .. .. 23. CHONEMORPHA.

Albumen of seed none; flowers, leaves and follicles moderate-sized.. .. 24. RHYNCHODIA.

Lobes of corolla markedly spiral in bud; coma of seed decurrent on the beak .. .. 25. ANODENDRON.

Seeds not beaked:—

Seeds narrowed at the end; cotyledons linear:—

Albumen scanty; corolla-lobes entire, rounded 26. CLEGHORNIA.

Albumen copious; corolla-lobes fimbriate, acuminate .. .. 27. ICHNOCARPUS.

Seeds usually broadened at the end:—

Cotyledons oblong, or linear-oblong; corolla rather large, lobes more or less rounded:—

Calyx 5-partite, lobes lanceolate; cymes corymbose:—

Apex of seed slender below the tuft of the coma; follicles terete .. .. 28. AGANOSMA.

Apex of seed broadly flattened below the tuft of the coma; follicles more or less flattened .. .. 29. TRACHELOSPERMUM.

Calyx 5-fid, lobes narrow; cymes paniculate 30. EPIGYNUM.

Cotyledons narrowly linear; corolla very small, lobes very oblique, usually forked .. .. 31. MICRECHITES.

The following plants of this Family are cultivated, and seem to be occasionally found run wild in the Peninsula:—

1. ALLAMANDA CATHARTICA, Linn. Mantiss. II. 214 (1771). A scandent milky shrub, native of South America. It has oblanceolate acuminate leaves in whorls of 2 to 4 and large yellow flowers. PENANG: *G. King*; *Deschamps*. SINGAPORE: *T. Anderson*.

2. CARISSA CARANDAS, Linn. Mantiss. I. 52 (1767). A large ever-green thorny shrub, native of India, with small white flowers and an edible fruit. MALACCA: *Maingay*.

3. LOCHNERA ROSEA, Reichb. Consp. Reg. Veg. 134 (1828). A garden shrub with shining obovate leaves and white or pink flowers; common in gardens, and also found run wild on roadsides especially near the coast. It is probably native of the West Indies. PENANG: *Curtis* 1067.

There are probably others, which, like *Plumeria acutifolia*, Poir., *Nerium Oleander*, Linn., and *Thevetia nerifolia*, Juss., are commonly cultivated in gardens in the Peninsula, but do not run wild. We have, however, seen no specimens.

Tribe I.—CARISSEÆ.

1. WILLUGHBEIA, Roxb.

Large sarmentose or climbing shrubs, generally bearing tendrils which are modified peduncles. *Leaves* opposite, shortly petiolate, penninerved. *Flowers* in dense, rarely in lax, axillary cymes; pedicels enlarged in fruit. *Calyx* 5-partite, eglandular. *Corolla* hypocrateriform, the mouth naked; lobes broad or linear, overlapping to the left, nearly straight in bud. *Stamens* inserted near the base of the tube, included; anthers lanceolate, the connective apiculate, the cells rounded at the base. *Disk* none. *Ovary* entire, 1-celled; style short, its top obconic or urceolate; stigma capitate or ovoid-conical, often slightly annulate at the base and slightly bifid at the apex; ovules numerous, on two parietal placentas. *Fruit* a large globose berry with a hard pericarp. *Seeds* numerous, embedded in pulp, ellipsoid, compressed; albumen none; cotyledons fleshy, thick, plano-convex; radicle short.—**DISTRIB.** India, Ceylon, Burma, Malay Peninsula and Archipelago; about 12 species.

Cymes with stout peduncles and pedicels; stamens usually near the base or middle of the corolla-tube; stigma conical, on a short style (Subgenus I. EUWILLUGHBEIA):—

Main nerves of leaves 6 to 8 pairs; leaves orbicular or elliptic, pale when dry, glaucescent beneath; corolla-lobes 1 in. long 1. *W. grandiflora*.

Main nerves of leaves 10 to 16 pairs, rather distant:—

Corolla-lobes .3 to .4 in. long; leaves scarcely coriaceous:—

Cymes few-flowered, nearly glabrous; leaves long acuminate .. .. 2. *W. edulis*.

Cymes many-flowered, pubescent; leaves obtuse or with a short blunt tip .. .. 3. *W. oblonga*.

Corolla-lobes under .25 in. long; leaves coriaceous or nearly so:—

Main nerves flattened on lower surface of coriaceous leaves 4. *W. coriacea*.

Main nerves sharp and slender on lower surface of thinly coriaceous leaves .. .. 5. *W. firma*.

Main nerves of leaves over 20 pairs, parallel and close:—

Corolla-lobes .3 in. long; leaves thinly chartaceous, up to 10 in. long, blunt-acuminate at apex .. 6. *W. martabanica*.

Corolla-lobes .4 to .7 in. long; leaves thinly coriaceous, hardly over 6 in. long, sharply acuminate at apex .. 7. *W. tenuiflora*.

Cymes with slender peduncle and pedicels; stamens near the top of the corolla-tube; stigma cylindric, seated on the obconic top of the slender style (Subgenus II. URNULARIA):—

Main nerves of leaves under 20; corolla-lobes ovate, recurved in flower .. .. 8. *W. flavescens*.

Main nerves of leaves over 20; corolla-lobes narrowly oblong, erect in flower .. .. 9. *W. rufescens*.

1. *WILLUGHBEIA GRANDIFLORA*, Dyer in Herb. Kew.; Hook. f. Fl. Br. Ind. III. 625 (1882). A stout climbing shrub; branchlets stout, dark brown to nearly black; tendrils woody, thick, branched. *Leaves* coriaceous; orbicular or elliptic, obtuse or with a very short blunt broad acumination at apex, rounded at base; glabrous and shining, pale reddish-yellow on the upper surface, cinnamon-coloured, soft and glaucescent on the lower; margins slightly recurved; 3 to 5 in. long, 3 to 3·5 in. broad; midrib stout, impressed on the upper surface, somewhat flattened on the lower; main nerves 6 to 8 pairs, distant, impressed above, raised beneath, at an angle of about 60° with the midrib, at first straight then curving near the margin to meet in an irregular intramarginal nerve; secondary nerves few and chiefly near the apex; reticulations transverse, distinct but not prominent; petiole stout, rugose or corrugated, channelled above, ·5 to 1 in. long. *Cymes* sub-sessile, crowded, puberulous; bracteoles broadly ovate, ciliate; pedicels stout, ·05 to ·1 in. long; buds cylindric-clavate, ·45 in. long; flowers white, reddish at base. *Calyx* broad, thick, ·1 in. long; lobes rounded, much imbricate, obtuse, ciliate, longer than the short tube. *Corolla*-tube slender, ·5 in. long, slightly dilated near the base opposite the stamens, villous within above the stamens; lobes 1 in. long, oblong-spathulate, long-ciliate on the margins, rounded at tip. *Anthers* lanceolate, apiculate, base cordate, ·06 in. long; filaments slender, short, curved. *Ovary* broad-conical; style short, cylindric, urn-shaped at top; stigma conical, bifid, branches slender. *Fruit* not seen. *Ancyclocladus glaucinus*, Pierre in Bull. Soc. Linn. Par. nouv. sér. 98.

MALACCA: *Maingay* (K.D.) 1047. — *DISTRIB.* Borneo (*Beccari* 3335; *Haviland* 2301, 3045).

2. *WILLUGHBEIA EDULIS*, Roxb. Cor. Pl. III. t. 280 (1819), and Fl. Ind. II. 57. A large climbing shrub; bark dark brown, tubercled; branchlets slightly angled, pale brown to dark brown, prominently lenticellate; tendrils long, branched. *Leaves* chartaceous when dry; oblong or obovate-oblong, long acuminate at apex, cuneate at base; olivaceous-brown and dull on the upper surface, reddish-brown and sometimes shining on the lower; margins crispately undulate, slightly recurved; 4 to 7 in. long, 2·5 to 3·25 in. broad; midrib stout, impressed on the upper, raised on the lower surface; main nerves 12 to 16 pairs, starting at an angle of 50° to 60° with the midrib and curving upwards to anastomose near the margin; secondary nerves few, chiefly near the ends; reticulations transverse, fairly prominent; petiole ·2 to ·6 in. long. *Cymes* axillary, few-flowered, about as long as the petioles; peduncle stout, ·15 in. long; bracteoles ovate, acute, early caducous, leaving a prominent scar; pedicels short, angular; buds oblong-clavate,



about .5 in. long; flowers white or pink. *Calyx*-lobes .05 to .075 in. long, ovate, acute, ciliate; tube shorter than lobes. *Corolla*-tube cylindric, dilated in the middle opposite the stamens; lobes lanceolate, .35 to .4 in. long, ciliate on the edges. *Anthers* sub-sagittate, .05 in. long; filaments short, bent. *Ovary* conical, acute; style short; stigma conical, striate, puberulous. *Berry* large, sub-ovate, the size of a lemon; pericarp orange-coloured, thick. *Seeds* many, in a yellowish fibrous pulp; cotyledons thick, fleshy. A. DC. Prodr. VIII. 321; Kurz For. Fl. II. 165; Hook. f. Fl. Br. Ind. III. 623 (*in part*); Bl. Bijdr. 1034; Miq. Fl. Ind. Bat. II. 391. *Hunteria*?, Wall. Cat. 9066.

DINDINGS: Pangkor, at Gunong Tunggyal, *Curtis* 1629.—DISTRIB. India (Assam, Sylhet, Chittagong), Burma.

3. *WILLUGHBEIA OBLONGA*, Dyer in Herb. Kew.; Hook. f. Fl. Br. Ind. III. 625 (1882). A large climbing shrub; branchlets very stout, obtusely angled, with pale greyish-brown bark rough with close-set small lenticels. *Leaves* chartaceo-coriaceous; elliptic or elliptic-oblong, obtuse at apex or with a short broad blunt or almost emarginate acumination, rounded at base or somewhat acute when young, almost auricled; both surfaces when dry dark reddish-brown, opaque; margins recurved; 3 to 6 in. long, 1.5 to 3 in. broad; midrib broad, flat on the upper, raised on the lower, surface; main nerves 10 to 15 pairs, irregularly spaced, the lower ones rather near together, the middle and upper ones further apart, starting at about 70° with the midrib and gradually curving upwards to anastomose near the margin; secondary nerves few and inconspicuous; reticulations many, irregularly netted; petiole stout, .25 in. long. *Cymes* small, sessile, dense-flowered, pubescent; bracteoles ovate acuminate; pedicels .05 in. long; buds oblong-clavate, .25 to .5 in. long. *Calyx*-lobes ovate-oblong, ciliate, pubescent within, .075 in. long; tube thick, short. *Corolla*-tube cylindric, .2 in. long, dilated in the middle opposite the stamens; lobes .3 to .4 in. long, linear-oblong, ciliate at the margins. *Anthers* lanceolate, apiculate, .05 in. long; filaments short, curved. *Ovary* glabrous, conical; style slender; stigma conical. *Berry* many-seeded, oblong; pericarp leathery, rough. *Seeds* ovoid, .5 in. long; testa thin; cotyledons fleshy.

MALACCA: *Maingay* (K.D.) 1089; at Ayer Panás, *Goodenough* 1396.

4. *WILLUGHBEIA CORIACEA*, Wall. Cat. 1620 (1829), and Pl. As. Rar. III. 45 (1832). A large glabrous climbing shrub; branches stout, obscurely angled, black, enlarged at the nodes; branchlets slender, angled, smooth; tendrils slender, branched. *Leaves* coriaceous; elliptic or elliptic-lanceolate, acute or shortly and bluntly acuminate at apex, cuneate or rounded at base; glabrous and shining on both surfaces when dry especially on the upper, both surfaces reddish-brown when

dry, the upper tinged with olivaceous; margins recurved, more or less cartilaginous; 3·5 to 6 in. long, 1·5 to 2·5 in. broad; midrib stout, broad, impressed above; main nerves 10 to 12 pairs, starting at 70° with the midrib, at first straight then curving to near the margin, where they are joined by small loops, raised on the upper, raised and flattened on the lower surface; reticulations obscure, more visible on the upper surface; petiole ·3 to ·4 in. long, stout, channelled above. *Cymes* sessile, crowded, less than 1 in. long; bracteoles very small, broad, obtuse, persistent, ciliate; flowers white; buds cylindric-clavate, ·4 to ·5 in. long. *Calyx* ·15 in. long, subhemispheric; lobes rounded, obtuse, ciliate. *Corolla* thickly coriaceous; tube inflated in the middle opposite the stamens, constricted at the base and at the mouth, ·15 to ·2 in. long; lobes oblong, obtuse, ·25 in. long, the margins incurved. *Anthers* ovate-lanceolate, apiculate, ·05 in. long; filaments slender, short. *Ovary* ovoid-globular, conical, glabrous; style short, ·025 in. long; stigma cylindric-conical with a broad white annulus at its base. *Berry* obovoid, 3 in. long by 2·25 in. in diam., yellow when ripe; pericarp thick, leathery. *Seeds* red, ·75 in. long, embedded in pulp, which hardens in drying. A. DC. Prodr. VIII. 321; Hook. f. Fl. Br. Ind. III. 623; Miq. Fl. Ind. Bat. II. 391.

PENANG: on Government Hill, *Curtis* 847; *Ridley* 9359. PERAK: *Scortechini*; *King's Collector* 5331, 6976. MALACCA: *Griffith*; *Maingay* (K.D.) 1048; *Curtis* 3485; *Derry* 120, 399, 461, 1190, 1198. SINGAPORE: *Wallich* 1620; *Lobb*; *Hullett* 511, 626; *Ridley* 1641, 3594, 9501.

5. WILLUGHBEIA FIRMA, Blume Mus. Bot. Lugd.-Bat. I. 154 (1850). A large glabrous climbing shrub; branches stout, obtusely angled, bark reddish-brown or -grey, smooth, fissured; branchlets similar, nearly quadrangular, lenticellate; tendrils branched, slender. *Leaves* thinly coriaceous; elliptic to elliptic-lanceolate or elliptic-oblong, shortly and obtusely acuminate at apex, acute or cuneate at base; both surfaces glabrous, shining, the upper more or less olivaceous when dry, the lower reddish-brown; margin slightly recurved; 3 to 5 in. long, 1·25 to 2·25 in. broad; midrib stout, rather impressed above; main nerves 10 to 15 pairs, slender, starting at an angle of 70° to 75° with the midrib and at first straight then curving and branching so as almost to meet near the margin, prominent on the under, obscure on the upper, surface; secondary nerves few, between successive main nerves and at a different angle; reticulations distant, obscure; petiole ·4 to ·5 in. long, stout. *Cymes* axillary, sub-sessile, many-flowered, not much longer than the petioles; bracteoles broadly ovate, obtuse; buds oblong-clavate, ·3 to ·4 in. long, striated by the lobes of the corolla; flowers white or pale yellow. *Calyx* campanulate, ·1 to ·15 in. long; lobes half the length, ovate,

obtuse, ciliate. *Corolla*-tube cylindric, dilated in the middle opposite the stamens, .2 in. long; lobes as long as or slightly longer than the tube, linear-oblong, margins sometimes incurved, glabrous. *Anthers* ovate, acute, .03 in. long; filaments slender, short. *Ovary* ovoid, acute; style short; stigma ovate-conical with a bifid tip. *Berry* ovoid or pyriform, orange-yellow, 3 to 4 in. long, 2 to 2.5 in. broad; pericarp thick. *Seeds* embedded in pulp, red, .5 in. long or longer, elliptic-oblong, plano-concave; testa membranous; cotyledons thick. MIQ. Fl. Ind. Bat. II. 390; Hook. f. Fl. Br. Ind. III. 624; Hook. Ic. Pl. t. 2344; Stapf in Trans. Linn. Soc. Ser. 2, IV. 207. *W. Burbidgei*, Dyer in Kew Gard. Rep. 1880, 44, 46.

KEDAH: on Lankawi Island, *Curtis*. PENANG: *Curtis* 1500; *Ridley* 9468. PERAK: *Scortechini* 651, 2120; *Wray* 5, 594, 3208, 4176; *King's Collector* 6663, 10050, 10854. MALACCA: *Griffith*; *Derry* 101; *Hervey*; *Irving* 228; *Curtis* 3476. SINGAPORE: *Murton* 58; *Cantley* 95; *Ridley* 4421, 4431, 5713, 6522.—DISTRIB. Sumatra, Borneo (*Beccari* 2273; *Ridley* 9055, &c.).

This species is with difficulty distinguished from *W. coriacea*, but its leaves are less coriaceous, and the main-nerves are usually closer, and are slender and sharp instead of being broad and flattened. The fruit is edible, and the stems give a kind of gutta-percha or rubber (*Curtis*). *Curtis's* specimens bear the Malay names "Gutta Garoo," "Gutta Garok," "Getab Ujol," "Getah greep betina." The Fl. Br. Ind. gives "Gutta Singgarip," after *Murton*. As *Stapf* remarks in Hook. Ic. t. 2344, the Kew material shows that, in Borneo especially, there are varieties locally known by different names, and differing chiefly in the fruit, which ought to be studied on the spot.

*King's Collector* 7729 from Gunong Budo, Perak, at 500 to 800 ft., seems to be a large-leaved variety of this species. The leaves reach 7 in. in length and 3.5 in. in breadth; when dry they are greenish on the upper and shining brown on the lower surface. The flowers are in sessile cymes, and the corolla has oblong blunt lobes.

6. *WILLUGHBEIA MARTABANICA*, Wall. Cat. 1619 (1827), and Pl. As. Rar. III. 45, t. 272 (1832). A large glabrous climbing shrub; branches stout, dark brown; branchlets dark brown, lenticellate; tendrils long, branched. *Leaves* thinly chartaceous; oblong or ovate-oblong, or ovate-lanceolate, or obovate, shortly, bluntly and abruptly acuminate at the rounded apex, or with a short broad obtuse or emarginate point, acute or cuneate at base; both surfaces shining, the lower paler; margins recurved, undulate; 3 to 10 in. long, 1.25 to 3.5 in. broad; midrib stout, slightly channelled above, raised beneath; main nerves very many, 20 to 26 pairs more or less, parallel, at an angle of from 70° (middle) to nearly 90° (ends) with the midrib, straight to near the edge and then rather suddenly curving and anastomosing; secondary nerves very many, between and often difficult to distinguish from the main-



nerves, frequently recurrently branching; reticulations many, prominent; all more or less raised on the upper surface; petiole .25 to .5 in. long, slender. *Cymes* axillary, sessile, about twice as long as the petiole, dense-flowered; pedicels scarcely .05 in. long, pubescent; bracteoles ovate-lanceolate, sheathing the cyme-branches; buds oblong-clavate, about .5 in. long; flowers pink or orange-yellow. *Calyx* deeply lobed, nearly glabrous, .1 in. long; lobes broadly ovate, obtuse, ciliate. *Corolla*-tube cylindric, slightly dilated in the middle opposite the stamens, .175 in. long, slightly pubescent within; lobes oblong-falcate, obtuse, .3 in. long, margins sparsely ciliate. *Anthers* sagittate, the tips nearly reaching the throat of the corolla-tube; filaments slender. *Ovary* broadly ovoid, glabrous; style slender; stigma cylindric-conical. *Berry* ovoid-globose, 3 to 4 in. in diameter; pericarp orange-yellow, thick, hard, the seeds embedded in a fibrous edible yellowish pulp. *Seeds* flattened, nearly orbicular in outline; testa leathery; cotyledons thick, conform to the seed, plano-convex; radicle minute. A. DC. Prodr. VIII. 321; Kurz For. Fl. II. 165. *W. edulis*, Roxb.; Hook. f. Fl. Br. Ind. III. 623 (in part). *W. dulcis*, Ridley in Trans. Linn. Soc. Ser. 2, III. 319.

PENANG: *Curtis* 687. MALACCA: *Griffith*; *Goodenough* 1450. PAHANG: at Praman, near Pekan, *Ridley* 1022.—DISTRIB. Burma.

7. *WILLUGHBEIA TENUIFLORA*, Dyer in Herb. Kew.; Hook. f. Fl. Br. Ind. III. 625 (1882). A large climbing shrub; branches with black bark; branchlets greyish-brown, lenticellate, striate when dry; innovations puberulous. *Leaves* thinly coriaceous, membranous when young; elliptic, elliptic-oblong or oblanceolate, sharply and somewhat abruptly acuminate at apex, cuneate at base; both surfaces glabrous and somewhat shining when dry, the upper dark olivaceous-brown, the lower bright reddish-brown; margins cartilaginous, recurved, almost revolute; 4 to 6 in. long, 1.25 to 2 in. broad; midrib slender, prominent, red; main nerves 20 to 30 pairs, very slender, the middle ones at from 70° to 80° with the midrib, the upper at a less angle, the lower nearly or quite at right angles, straight to near the margin where they branch and curve slightly, prominent beneath, less so above; secondary nerves occasional, between and similar to the main-nerves; reticulations invisible except in very young leaves; petiole .5 to .6 in. long, channelled above. *Cymes* axillary, about twice as long as the petioles, densely crowded with many short few-flowered branches, rusty-puberulous like the calyx, pedicels and bracteoles; bracteoles ovate, acute, deciduous; pedicels .05 to .1 in. long; buds oblong-clavate, elongate, reaching nearly 1 inch; flowers white. *Calyx* campanulate; lobes ovate, obtuse, ciliate, 1 in. long. *Corolla*-tube narrowly cylindric with a nearly globular dilatation close above the base and opposite the stamens,



·4 in. long, villous within above the stamens; lobes ·4 to ·7 in. long, oblong-falcate, obtuse. *Anthers* cordate-lanceolate, ·075 in. long; filaments slender, puberulous, bent close to the back of the connective and there attached to a broad swelling. *Ovary* hemispheric, top nearly truncate; style short, thick, ellipsoid; stigma conical. *Berry* 4 in. long, "pyriform, abounding in caoutchouc; pericarp thick, leathery; seeds many, naked; cotyledons pink, fleshy" (*Maingay*).

PERAK: *Ridley* 3075; *Wray* 3773. DINDINGS: *Curtis*. MALACCA: *Griffith*; *Maingay* (K.D.) 1049; *Curtis* 3484; *Hervey*; *Cantley* 105; *Goodenough* 1785. SINGAPORE: *Ridley* 11333. — *DISTRIB.* Sumatra (*van Romburgh* 469).

*Curtis* says that the caoutchouc of this species is of no use. *Wray* No. 3773 is a specimen in young fruit; the fruits terminal! but otherwise like other specimens. The apparently terminal fruits probably arose from the cymes of the uppermost axils, the much enlarged pedicels having absorbed the rest of the small inflorescence or caused it to fall. The Sumatra specimen has a less puberulous inflorescence, but otherwise does not seem to differ.

8. *WILLUGHBEIA FLAVESCENS*, Dyer in Herb. Kew.; Hook. f. Fl. Br. Ind. III. 625 (1882). A slender climbing shrub, all parts glabrous; bark dark grey, rough, with large elliptic lenticels; branchlets dull greyish- or reddish-brown when dry, obtusely angled, the nodes swollen, bases of fallen leaves tuberculate. *Leaves* coriaceous; elliptic, shortly and bluntly acuminate at apex, rounded or sometimes shortly cuneate at base; both surfaces glabrous, the upper dark greenish-brown, the under pale reddish-brown when dry; margins cartilaginous, recurved; 2·5 to 4·5 in. long, 1·25 to 2·25 in. broad; midrib stout, impressed above; main nerves slender, 16 to 20 pairs, rather irregular in angle and spacing, usually at from 70° to 80° with the midrib, and curving gently to and along the margin, raised beneath; secondary nerves many, between the main-nerves and similar to them; reticulations very oblique, sometimes nearly parallel to the nerves, raised beneath; petiole ·4 to ·6 in. long, bordered by the decurrent margins of the blade. *Cymes* axillary, sessile, as long as or up to twice as long as the petioles, dichotomous; branches slender; pedicels ·1 in. long; bracteoles minute, acute; buds conoidal at tip, ·2 to ·3 in. long. *Calyx* ·06 in. long, campanulate, with 5 deep ovate, acute, ciliate lobes. *Corolla* hypocrateriform; the tube elliptic-ovoid ·15 in. long, mouth much constricted; lobes ovate-falcate, acute, recurved in flower, ·15 in. long, margins involute. *Stamens* near the apex of the tube, included, ovate; filaments short, geniculate. *Ovary* elliptic-ovoid, glabrous, narrowed into the ·075 in. long slender style, which is obconic at top; stigma small, cylindric, rounded at tip.

Berry yellow or greenish-yellow turning to red, ovoid-cordate or nearly globose; 3 to 4 in. in diam.; pericarp thick, coriaceous, smooth. *Seeds* few, large, embedded in pulp, elliptic, about .6 in. long by .4 in. broad; testa membranous; cotyledons plano-convex, thick; radicle minute. *Chilocarpus flavescens*, Kew Gard. Report, 1880, 47. *Urnularia flavescens*, Stapf in Hook. Ic. Pl. t. 2711, p. 2.

PERAK: *King's Collector* 7286, 7848. PROVINCE WELLESLEY: *Ridley* 9389. MALACCA: *Hervey*. SINGAPORE: *Murton* 120; *Ridley* 6936, 10123; *Cantley* 52.

We do not propose to separate "*Urnularia*" from "*Willughbeia*." Dr. Stapf has kindly explained that he proposed the new genus under the belief that the seeds were albuminous, which, however, he finds now they are not. The mistake arose from a fruit of another *Apocynacea*, presumably one-half of a foliole of a species of *Rejoua*, having been mixed up with the flowering specimens of *Urnularia ovatifolia*.

9. *WILLUGHBEIA RUFESCENS*, Dyer in Herb. Kew.; Hook. f. Fl. Br. Ind. III. 626 (1882). A large climbing shrub, glabrous; branches dark greyish-brown, swollen at the nodes, obtusely angled, rough; branchlets cinereous-brown when dry, slender. *Leaves* coriaceous; elliptic-oblong or -lanceolate, very obtusely short-acuminate at apex, cuneate or rounded, often unequally, at base; glabrous on both surfaces, olivaceous-brown and shining above, dull and reddish-brown beneath; margins recurved; 2 to 4 in. long, .5 to 1.5 in. broad; midrib stout, deeply impressed above, raised beneath; main nerves 20 to 25 or more (the apex ones very close and difficult to count) pairs, at an angle of about 75° with the midrib, straight to near the margin where they curve; secondary nerves many, between the main nerves and similar to them, reticulations oblique; all faint on the upper, rather thick and distinct on the lower surface; petiole .2 to .3 in. long. *Cymes* axillary, sessile, slightly longer than the petioles with few slender short lax few-flowered branches; bracteoles minute, ovate; pedicels .2 in. long, slender; buds linear-oblong, .25 in. long; flowers yellow. *Calyx* under .1 in. long, deeply lobed; lobes broadly ovate, subacute, ciliate on the margins. *Corolla* hypocrateriform; tube ellipsoid, glabrous, .15 in. long; lobes narrowly oblong, obtuse, erect when open, .15 in. long, margins incurved. *Anthers* ovate, apiculate; filaments geniculate, slender, inserted below the middle of the tube. *Ovary* broadly ovoid, as long as the calyx; style short, .06 in. long, ending in an obconic top; stigma narrow, cylindric. *Berry* (immature) globose, 1.5 to 2 in. in diam.; pericarp thick, leathery, smooth. *Seeds* embedded in pulp.

PERAK: *Scortechini*. MALACCA: *Maingay* (K.D.) 1092; *Hervey*. PROVINCE WELLESLEY: at Krian, *Ridley* 9389. SINGAPORE: *Ridley* 3996, 6023, 6047, 6143.—DISTRIB. Sumatra (*Forbes* 3232).

## 2. CHILOCARPUS, Blume.

Sarmentose or scandent woody shrubs. *Leaves* coriaceous or chartaceous, opposite, petiolate, penninerved, the main-nerves numerous, nearly at right angles to the midrib, sometimes indistinct. *Flowers* usually small, slender, in dense axillary cymes or terminal or axillary trichotomous panicles; pedicels enlarged in fruit. *Calyx* 5-partite, the lobes short, glands none. *Corolla* hypocrateriform; the tube cylindric, slightly dilated at the insertion of the stamens, the throat without scales; lobes 5, short, broad, twisted, overlapping to the left, twisted to the right. *Stamens* inserted at or below the middle of the tube, included; anthers lanceolate, acute, the cells rounded at the base, inappendiculate. *Disk* none. *Ovary* entire, 1-celled, with 2 parietal prominent multi-ovular placentas; style short; stigma conical or ovoid, faintly bifid; ovules 2- or many-seriate on each placenta. *Fruit* a fleshy berry, ultimately bivalved, dehiscent; pericarp thick. *Seeds* embedded in pulp with fibrous and corky arils, numerous, compressed or thick, often grooved near the hilum; either with thin testa and horny albumen, or with thick granular testa and thin albumen, albumen equable or ruminant; cotyledons flat sub-foliaceous, broad or narrow; radicle elongate, terete.—DISTRIB. India, Burma, Malay Archipelago and Peninsula, and tropical Australia; species about 16 to 18.

The nature of the corky processes which we call “arils” above is a little difficult to understand. They are well shown in the excellent figure of the fruit of *C. suaveolens*, Bl., in t. liii. in Blume Mus. Bot. Lugd.-Bat. I., but the author gives no explanation of his drawings. We prefer to use the word aril, as it seems to us the most explanatory. When the fruits and seeds of all the species are known, it may be possible to make two genera, or, at any rate, two subgenera, according to the testa and albumen.

Flowers small, corolla-tube under .3 in. long (where known); leaves medium-sized or small, nerves not very prominent:—

Flowers in terminal or axillary cymes as long as or longer than the leaves:—

Flower-pedicels without imbricate bracteoles, only bracts at the bases of the pedicels; secondary nerves of the leaves recurrently branched:—

Leaves 2.25 to 3 in. long, thinly coriaceous; main nerves many, easily visible when dry; peduncles under 1 in. long; seeds with thin testa and horny albumen ..

1. *C. atro-viridis*.

Leaves 3 to 5 in. long, chartaceous; main nerves many, not easily seen when dry; peduncles over 1.5 in. long; seeds not known .. .. .

2. *C. embelioides*.

Flower-pedicels with many imbricate bracteoles; seeds with the testa thick and granular and the albumen thin; secondary nerves of the leaves not recurrently branched ..

3. *C. decipiens*.

Flowers in axillary cymes much shorter than the leaves; flower-pedicels with imbricate bracteoles:—

Leaves coriaceous, more or less obovate:—

Cymes nearly sessile; leaves obtuse at the apex; fruit-pericarp usually tubercled without; seeds with thin testa and horny albumen .. .. . 4. *C. enervis*.

Cymes on peduncles nearly .5 in. long; leaves shortly apiculate; fruit unknown:—

Leaves coriaceous, upper surface dull brown, lower pale when dry; main nerves nearly at right angles to the midrib; corolla-lobes rhomboid-falcate .. .. . 5. *C. Cantleyi*.

Leaves chartaceo-coriaceous, upper surface nearly black shining, lower dark greyish-brown when dry; main nerves at about 75° with the midrib; corolla-lobes linear-falcate .. .. . 6. *C. nigrescens*.

Leaves scarcely coriaceous, oblong-lanceolate; fruit 2 to 2.5 in. long, about 1 in. broad; seeds with granular testa and thin fleshy albumen .. .. . 7. *C. minutiflorus*.

Flowers rather large, corolla-tube .7 to 1 in. long; leaves large, nerves very prominent; seeds with thin testa and horny albumen .. .. . 8. *C. costatus*.

1. *CHILOCARPUS ATRO-VIRIDIS*, Blume Mus. Bot. Lugd.-Bat. I. 153 (1850). A glabrous slender climbing shrub; young branches not much thicker than a crow-quill, pale brown, terete, sparsely lenticellate, swollen at the nodes. *Leaves* thinly coriaceous; narrowly elliptic-oblong or -lanceolate, shortly and bluntly caudate-acuminate at apex, cuneate at base; glabrous on both surfaces, dull when dry, the upper pale brown, the lower yellowish, punctulate; margins thinly cartilaginous, slightly recurved, crispate; 2.25 to 3 in. and even 5 in. long, .5 to 1.25 in., even 1.75 in., broad; midrib prominent, impressed above; main nerves very numerous, parallel, irregularly spaced, about 25 to 30 pairs; at an angle of about 75° with the midrib, straight to the margin to meet an intramarginal looped nerve very close to it (under .05 in.); secondary nerves very many, between the main nerves, recurrent from the marginal nerve and branched backwards, the branches forming the only visible reticulations; petiole .3 to .4 in. long, slender. *Cymes* very slender, terminal and axillary, reaching 2 to 4 in. in length, trichotomous; peduncles .5 to 1 in. long, flattened; branch peduncles slender, nearly as long; ultimate cymules corymbose or subumbellate; pedicels slender, .1 to .15 in. long; bracts leafy, caducous, one or two always at the base of each pedicel minute and scarious; buds clavate, .2 in. long, tip globose; flowers deep yellow. *Calyx* campanulate, under .1 in. long; lobes ovate-obtuse, margins hyaline. *Corolla*-tube short, .1 to .15 in. long, dilated in the middle opposite the stamens, glabrous except a ring of hair within below the stamens; lobes .1 in. long, falcate, broadly



notched on one side, recurved when open, acute at tip. *Anthers* very small, under .05 in. long; filaments scarcely any, pubescent. *Ovary* conoidal; style slender .05 in. long; stigma oblong, apiculate; ovules many. *Berry* ovoid, 1.75 in. long, 1.25 in. in diam., dehiscent in 2 concave valves; pericarp thick, hard, woody, smooth and yellow without. *Seeds* numerous, black, .35 in. long, .3 in. broad, oblate-globose, deeply grooved at the hilum, about one-third surrounded by an aril consisting of yellow angular corky masses and a tuft of minute net-like fibres; testa shining, thin, granular; albumen thick, horny; cotyledons ovate, obtuse, somewhat cordate, flat, .225 in. long; radicle slender, .15 in. long. Miq. Fl. Ind. Bat. II. 393; Hook. f. Fl. Br. Ind. III. 626. *Hunteria* ? *atro-viridis*, Wall. Cat. 1614; A. DC. Prodr. VIII. 351. *Winchia atro-viridis*, Kurz For. Fl. II. 170.

PERAK: on Maxwell's Hill, *Scortechini* 321; at 2,500 to 3,000 feet, *King's Collector* 6303, 8317. SELANGOR: at Batang Barjuntai, *Ridley* 7563; at Kent Estate 8557 (flowers white).—DISTRIB. Tavoy, Mergui.

We do not quote "Malabar" in the distribution because we think that *Chilocarpus malabaricus*, Bedd. Ic. Pl. Ind. Or. t. 175, is probably distinct from *C. atro-viridis*.

2. *CHILOCARPUS EMBELIOIDES*, King & Gamble, n. sp. A climbing shrub; branchlets slender, pale dull brown, almost smooth. *Leaves* chartaceous; elliptic-oblong, shortly acuminate at apex, narrowed somewhat unequally at base; glabrous on both surfaces and dull, the upper olivaceous when dry; margins pale, thin, crispate; 3 to 5 in. long, 1.25 to 2 in. broad; midrib slender, prominent on the lower, somewhat impressed on the upper, surface; main nerves 24 to 26 pairs, very slender, at an angle of 70° with the midrib, straight, meeting close to the margin a slender faint intramarginal nerve; secondary nerves alternate with the main nerves and joining both the intramarginal nerve and midrib, branched recurrently; reticulations obscure; petiole .2 to .4 in. long, slender, slightly rugose. *Cymes* axillary, lax, many-flowered, nearly as long as the leaves; peduncles slender, 1.5 to 1.75 in. long; branches trichotomous slender, about 1 in. long; ultimate cymules subumbellate; pedicels slender .15 in. long; bracts very small, ovate, acute, at the bases of the rachis-branches and pedicels; buds very short, clavate, tip globose. *Calyx* campanulate, .05 in. long; lobes very small, rounded, with hyaline, ciliate margins. *Corolla*-tube cylindric, .1 in. long, slightly constricted at the base and the naked throat, glabrous except for a ring of white villous hairs below the stamens; lobes broad, ovate-falcate, acute, .05 to .1 in. long. *Stamens* inserted a little above the middle of the tube; anthers lanceolate, apiculate; filaments very short. *Ovary* conical, attenuated into a short style just reaching the

stamens; stigma conical. *Berry* (immature) globular, smooth when fresh, wrinkled when dry. *Seeds* embedded in pulp.

PERAK: at Haram, *Scortechini* 711.

3. *CHILOCARPUS DECIPIENS*, Hook. f. in Fl. Br. Ind. III. 627 (1882). A glabrous slender climbing shrub; young branches twice as thick as a crow-quill, terete, dull brown when dry, with numerous elongate pale lenticels, swollen at the nodes. *Leaves* thinly coriaceous; narrowly elliptic-oblong or -lanceolate, obtusely and often obliquely long acuminate at apex, cuneate at base; glabrous on both surfaces and olivaceous-brown, the lower paler and minutely dotted; margins slightly recurved, crispate; 3 to 3.5 in. long, 1 to 1.5 in. broad; midrib prominent, pale, channelled above; main nerves 20 to 25 pairs, slender, parallel, at about 75° to 80° with the midrib, straight to the margin, close to which they join an intramarginal nerve, visible on both surfaces; secondary nerves many, usually alternate with the main nerves, also running to the intramarginal one, occasionally branched, but not recurrently; petiole slender, .25 in. long. *Cymes* terminal and axillary, 2 to 3-chotomous, forming a terminal leafy panicle up to 9 in. long and 6 in. broad; main peduncles 1 to 1.25 in. long, successive branches gradually shorter; ultimate cymules subumbellate; pedicels stout, covered with minute bracteoles spirally arranged, up to .2 in. long; bracts leafy caducous, those at the bases of the branches and pedicels ovate acute, sheathing, with pale margins; flowers not known. *Berry* linear-oblong, cylindric, 2.5 in. long by nearly 1 in. broad, on a stout many-bracteolate pedicel and calyx of ovate acute lobes, splitting when ripe; pericarp woody, minutely granular, green when fresh, reddish-brown when dry, nearly .1 in. thick. *Seeds* of various shapes, about .5 in. long; partly enclosed in a corky aril with fibres at its base; testa granular, deeply furrowed as is the thin fleshy albumen; cotyledons flat, nearly orbicular, .15 in. long; radicle .1 in. long.

PERAK: at Ulu Bubong, in dense jungle at 300 to 600 feet, *King's Collector* 10017, 10268. MALACCA: *Maingay* (K.D.) 1043, 1060. SELANGOR: on Kent Estate, *Ridley* 8557.

4. *CHILOCARPUS ENERVIS*, Hook. f. Fl. Br. Ind. III. 626 (1882). A stout woody glabrous climbing shrub; branchlets as thick as or thinner than a goose-quill, pale brown when dry, obtusely angled, the nodes raised and marked by a ridge; terminal buds resinous. *Leaves* coriaceous; narrowly obovate or oblanceolate, rounded or very briefly apiculate or sometimes shallowly emarginate at apex, long cuneate at base; both surfaces shining, the lower very pale when dry and often minutely puncticulate; the margin slightly cartilaginous, recurved; 3 to 5 in. long, 1.25 to 2 in. broad; midrib stout, prominent beneath,

channelled above; main nerves numerous, about 25 to 30 pairs, at about 80° with the midrib, faint on the upper surface, invisible on the lower; secondary nerves nearly as many as and between the main nerves, reticulations not visible; petiole .5 to .75 in. long, usually twisted. *Cymes* small, in dense axillary clusters, shorter than the petiole; pedicels very short, thick, spirally corrugated by the scars of fallen bracteoles, very much thickened in fruit; buds clavate, the tip globose; flowers minute, white. *Calyx* .05 in. long or less, deeply divided in 5 ovate, hyaline, puberulous, rounded lobes. *Corolla*-tube cylindric, slender, .3 in. long, inflated about one-third of the way up, opposite the stamens; throat naked; lobes obliquely falcate, apiculate on one side, .1 to .15 in. long. *Anthers* lanceolate, very small, rounded at the base; filaments very short. *Ovary* ovate, acuminate; stigma small, conoidal; placentas prominent. *Berry* orange-coloured, ellipsoid or obovoid, 1.5 to 2 in. long and 1 to 1.5 in. broad; pericarp thick, fleshy, smooth or much corrugated and tubercled externally, woody, dividing into two concave or flat valves. *Seeds* embedded in a fibrous pulp and enclosed in a pale orange corky lobed arillus on one side, .4 in. long, oblong or ovoid, sometimes flattened at the ends, deeply grooved at the hilum; testa black, shining, thin; albumen horny, thick; cotyledons flat, orbicular-cordate, .2 in. in diameter; radicle .1 in. long.

PERAK: at Thaipeng, Kalan Tujur, &c., *Wray* 593, 1118, 1804, 4026; *Scortechini* 189; *King's Collector* 3203, 3786, 7532, 8328, at 100 to 500 feet; *Cantley* 25. MALACCA: *Maingay* (K.D.) 1044.

5. *CHILOCARPUS CANTLEYI*, King & Gamble, n. sp. A glabrous climbing shrub; young branches as thick as a goose-quill, smooth, at first yellowish afterwards dark brown, obtusely angled, raised at the nodes and ridged. *Leaves* coriaceous; elliptic or oblanceolate, the apex obtuse or with a short blunt apiculus, long-attenuate at base; both surfaces dull when dry, the upper dark greenish-brown, the lower very pale greenish-yellow when fresh, puncticulate; margins slightly recurved; 3.5 to 4 in. long, 1.25 to 1.5 in. broad; midrib thick, channelled above, broad and conspicuous beneath; main nerves extremely faint on the upper surface when dry, invisible on the lower, apparently about 30 pairs at nearly right angles with the midrib and with many intermediate secondary nerves; petiole about .6 in. long, channelled above. *Cymes* axillary, glabrous, on stout somewhat flattened peduncles .4 to .5 in. long, many- (about 20-) flowered, few-branched; pedicels .1 in. long, with many obtuse imbricate bracteoles which are caducous and leave rough pits behind; buds clavate, the tip obtuse; flowers yellow. *Calyx* .075 to .1 in. long, lobes elliptic-rotund, thick with hyaline margins. *Corolla*-tube cylindric, .2 in. long, dilated slightly below the middle opposite the

stamens, constricted at throat; glabrous within except at the base; lobes .15 to .2 in. long, broadly rhomboid-falcate, plicate in bud. *Stamens* in the dilated part of the tube; anthers lanceolate, rounded at base, .05 in. long; filaments slender, pubescent below, as long as anthers. *Ovary* ovate, compressed, tapering to a .075 in. long style with short subglobular stigma. *Fruit* not known.

PERAK: near Ulu Kerling, 500 to 700 feet, *King's Collector* 8823; swamps in lower Perak, *Cantley* 227. SELANGOR: at Kwala Lumpor, *Ridley* 2839; *Curtis* 2354.

Curtis's specimen has more narrowly lanceolate leaves and a rather longer apiculus, with more slender branches, and has also, with Ridley's specimen, shorter peduncles to the inflorescence, but they seem both to be correctly this species, which comes very near to *C. enervis*, but has much less slender flowers and larger inflorescence.

6. *CHILOCARPUS NIGRESCENS*, King & Gamble, n. sp. A glabrous climbing (?) shrub; branchlets rather stout, nearly black, terete, the nodes somewhat swollen and usually ridged. *Leaves* chartaceo-coriaceous; elliptic-oblong or -oblanceolate, shortly and abruptly blunt-acuminate at apex, cuneate at base, often from nearly the middle of the blade; upper surface shining, nearly black when dry, lower a little paler and greyish-brown, minutely punctulate; margins slightly recurved; 3 to 5 in. long, 1.5 to 2 in. broad; midrib rather slender, slightly impressed above, raised beneath; main nerves 12 to 16 pairs at an angle of about 75° with the midrib, nearly straight to meet an arching intramarginal nerve at about .1 in. from the edge, faint on both surfaces; secondary nerves many, often recurrently branched; reticulations obscure; petiole .5 to .6 in. long. *Cymes* axillary, up to 1.5 in. long, more or less pyramidal, crowded; peduncle stout, flattened, .3 to .5 in. long; branches 3-chotomous, short; cymules subumbellate; pedicels about .15 in. long, densely strobilate with imbricate, rounded, pale-margined bracteoles; the bracts at the bases of the branches acute and sheathing; buds clavate, .4 in. long, the tip globose. *Calyx* campanulate, .05 to .075 in. long; lobes rather deep, broadly ovate, rounded, minutely ciliate. *Corolla*-tube narrowly cylindric, dilated at about one-third of the height from the base opposite the stamens, contracted at the naked mouth, glabrous without, slightly puberulous below the stamens within; lobes linear-falcate, acuminate, much twisted, about .2 in. long. *Stamens* inserted below the middle of the tube; anthers lanceolate, apiculate, rounded at base, .05 in. long, as long as the slender curved filaments. *Ovary* conoidal, glabrous, style slender, obconic above; stigma conical. *Berry* not known.



PERAK: on Government Hill and West Hill, *Curtis* 1040, 1121, 3086.

The same number, "*Curtis* 1040," is quoted by D. Oliver in Hook. Icon. t. 1758 (1888) as the type of *Melodinus coriaceus*, Oliver, but all our specimens have more or less the imbricated bracteoles of *Chilocarpus*, and are destitute of scales in the throat of the corolla, or of laciniae to its lobes. A comparison of the specimens of *Melodinus coriaceus* in the Kew Herbarium shows clearly that two species have been given the same number, but that the resemblance is superficial only. The real *M. coriaceus* has the leaves pale brown, and not black, when dry.

7. *CHILOCARPUS MINUTIFLORUS*, King & Gamble, n. sp. A glabrous climbing shrub; young branches thicker than a crow-quill, obtusely angled, striate, with thin scaly bark, pale when dry; nodes swollen, joined by a ridge. *Leaves* thinly coriaceous, elliptic or oblong-lanceolate, shortly obtusely-acuminate at apex, narrowed or almost rounded at base; upper surface green, lower waxy-white when fresh, both pale greenish-yellow when dry; margins slightly recurved; 2 to 2.5 in. long, .75 to 1.25 in. broad; midrib slender, prominent beneath; main nerves 9 to 12 pairs, at an angle of about 65° with the midrib, straight, joined at about .05 in. from the margin in an obscure intramarginal nerve, faint on both surfaces or sometimes not distinguishable; secondary nerves present, but, like the reticulations, not easily visible; petiole slender, .15 to .2 in. long. *Cymes* axillary, few-flowered, scarcely exceeding the petioles; peduncles very short, as are the branches and pedicels, which are sometimes enlarged and bear many imbricate bracteoles; bracts ovate-acute, sheathing; buds clavate, .15 in. long, the tip globose; flowers white or yellow. *Calyx* campanulate, .05 in. long, lobes very small. *Corolla*-tube inflated in the middle opposite the stamens, constricted above and below, .1 in. long, glabrous except a ring of hairs under the stamens within; lobes ovate falcate, acuminate, about .2 in. long. *Anthers* ovate-lanceolate, .05 in. long, nearly sessile. *Ovary* ovoid, tapering into a short style with conical tip. *Berry* on a stout pedicel, narrowly obovoid or pyriform, surmounted by a mamillate apex, splitting into 2 valves marked by slight vertical ridges; 2 to 2.5 in. long, .75 to 1.25 in. broad; pericarp thick, woody, dull green with specks when fresh, yellowish when dry. *Seeds* numerous, oblong, angular, .25 in. long, embedded in pulp and partly enclosed in a papery aril, sulcate at the hilum; testa granular, dark brown; albumen thin, fleshy; cotyledons ovate.

PERAK: *King's Collector* 5368, 5494, 7550, in dense jungle.

No. 5368 has broader leaves than the rest and pedicels with imbricating bracteoles, which the others only show a tendency to, but we see no reason to keep it separate.

8. *CHILOCARPUS COSTATUS*, Miq. Fl. Ind. Bat. II. 393 (1856). A stout climbing shrub; young branches as thick as a goose-quill, shining and purplish-brown when dry, sometimes obtusely angular, nodes swollen. *Leaves* chartaceous; elliptic or elliptic-oblong, shortly and very obtusely acuminate at apex, attenuate at base or sometimes rounded; both surfaces glabrous, upper shining, when dry the upper greenish- or dull purplish-brown, the lower yellowish-brown; margins recurved; 4 to 8 in. long, 2 to 3·5 in. broad; midrib stout, broad above and impressed, sharply angled beneath when dry; main nerves 12 to 20 pairs, nearly parallel, very conspicuous, impressed on the upper, raised on the lower surface, starting at an angle of from 65° to 75° with the midrib and gradually curving to join in a prominent intramarginal slightly looped nerve ·05 to ·1 in. from the margin; secondary nerves many, usually alternate with the main nerves but sometimes at irregular angles with the midrib, recurrent from the intramarginal nerve and branching backwards; reticulations few, oblique, inconspicuous; petiole ·5 to 1 in. long, bordered by the decurrent margins of the blade. *Cymes* axillary, puberulous, trichotomous, reaching about 3 in. in length and breadth, many-flowered, apparently whorled; peduncles ·5 to 1·5 in. long, stout, flattened; branch peduncles ·3 to ·6 in. long, these again branched; ultimate cymules subumbellate; pedicels ·1 to ·15 in. long; bracts caducous; bracteoles ovate acuminate, grey-puberulous, the margins hyaline, at the bases of the pedicels; buds clavate with globose tips, ·75 in. long; flowers yellowish. *Calyx* campanulate, ·075 in. long; lobes ovate, rounded, margins hyaline minutely ciliate. *Corolla*-tube very slender, ·7 to 1 in. long, dilated a little above the base opposite the stamens, pubescent at the base within, otherwise glabrous; lobes ovate-lanceolate, acuminate, reaching ·5 in. long and about ·25 in. broad. *Anthers* lanceolate, ·075 in. long, cells rounded at base; filaments slender, as long as anthers, villous at base. *Ovary* ovate, acuminate, compressed, smooth, glabrous; style slender, ·1 in. long; stigma ovoid, apiculate. *Berry* large, ovoid when young, elliptic when ripe, with a smooth boss at the apex, and flattened base; 2·5 to 3 in. long, 1·5 to 2 in. broad; pericarp thick, orange-yellow, smooth. *Seeds* embedded in fibrous pulp and half surrounded by a fleshy yellow arillus, oblong-subquadrate, deeply channelled at the hilum; testa thin, brown; albumen thick, horny; cotyledons ovate-orbicular, flat; radicle short. *C. Maingayi*, Dyer; Hook. f. Fl. Br. Ind. III. 627.

PENANG: at Ayer Etam, *Curtis* 475. PERAK: at Sungie Larút, *Wray* 2428; *Scortechini*; *King's Collector* 3261, 5264, 10848. PAHANG: *Ridley* in Trans. Linn. Soc. Ser. 2, III. 319 (*C. Maingayi*). MALACCA: *Maingay* (K.D.) 1045, 1046; *Curtis* 3479. SELANGOR: *Ridley* 2726.

We are unable to separate *C. Maingayi* from *C. costatus*. Teysmann's specimen of the latter in the Kew Herbarium has only immature flower-buds, rather smaller than the buds of *C. Maingayi*, but some of our specimens have them in quite as immature a stage. Curtis says it gives a very white rubber.

### 3. LEUCONOTIS, Jack.

Erect or climbing shrubs. *Leaves* opposite, distantly penninerved. *Flowers* in pedunculate axillary cymes, 4-merous. *Calyx* 4-lobed or -partite, thickened at the base, eglandular or minutely glandular within. *Corolla* hypocrateriform; tube slightly dilated in the middle opposite the stamens, throat naked; lobes 4, short, overlapping to the left. *Stamens* 4, included in the tube; anthers linear-lanceolate, the cells rounded at the base. *Disk* none. *Ovary* 2-celled; style short; stigma thickened, with a very short bifid apiculus; ovules 2 to 3 in each cell, axile, laterally affixed. *Fruit* an ovoid or globose berry, pulpy within. *Seeds* 1 to 6, ovoid-oblong; testa membranous; albumen none; cotyledons thick fleshy, the inner surfaces irregular; radicle short. —  
DISTRIB. Malay Peninsula and Archipelago; about 6 species.

Calyx 4-partite, lobes long linear; intramarginal nerve of leaves very prominent; ovules 3 in each cell; seeds up to 6 .. 1. *L. eugenifolius*.

Calyx 4-lobed, lobes short rounded; intramarginal nerve obscure; ovules 2 in each cell; seeds usually 2:—

Corolla-tube .25 in. long; peduncles very stout; calyx and bracteoles very thick fleshy; berry obovoid .. 2. *L. Maingayi*.

Corolla-tube .3 to .4 in. long; peduncles rather thick; calyx and bracteoles moderately large and thick; berry ellipsoid .. 3. *L. Griffithii*.

1. LEUCONOTIS EUGENIFOLIUS, A. DC. Prodr. VIII. 331 (1844). A small erect or climbing shrub; branchlets thinner than a goose-quill, dark-rusty-puberulous at first, afterwards glabrous, obscurely angled. *Leaves* chartaceous; elliptic-oblong, sometimes oblanceolate, abruptly and often obliquely obtuse-caudate-acuminate at apex, rounded at base or sometimes slightly cuneate; upper surface dull olivaceous-brown, lower surface pale yellowish-brown, minutely punctate and rusty-puberulous on the nerves; 2.5 to 4.5 in. long, 1 to 2 in. broad; main nerves 8 to 10 pairs, very prominent on the lower surface, at right angles to the midrib, straight to join in a conspicuous intramarginal nerve at nearly .1 in from the edge, the said nerve joining the midrib below the acumen; secondary nerves usually 1 or 2 between the main nerves, reticulations obscure; petiole slender, .3 to .5 in. long, rusty-pubescent. *Cymes* 1 to 1.5 in. long, erect, rusty-pubescent, usually about 6- to 12-flowered; peduncle .5 in. long; branches 3, the side ones few-flowered, the mid one usually again branched; pedicels about .2 to

·3 in. long; bracts leafy, linear or spatulate, ·5 to 1 in. long; bracteoles linear, obtuse at tip, similar to calyx-lobes; buds clavate, the tip ovoid; flowers yellowish. *Calyx*-tube very short; lobes linear, ·2 in. long, pubescent and with few hispid hairs near the obtuse tip, slightly recurved; glands few, minute. *Corolla*-tube ·3 to ·4 in. long, glabrous except near the base inside; lobes ·15 to ·2 in. in diameter, ovate-cordate, densely pubescent, the margins incurved. *Anthers* 4, linear-lanceolate, apiculate, ·15 in. long; filaments ·05 in. long, slender, decurrent in the tube. *Ovary* conoidal, more or less 4-angled, glabrous or pubescent; style slender, ·125 in. long; stigma globose, apiculus bifid; cells 2, ovules 3 in each cell. *Berry* ovoid, about 1·25 to 1·5 in. long and 1 in. in diameter; pericarp leathery, shining without, wrinkled when dry, pulp very scanty, septum thin. *Seeds* up to 6, ovoid-oblong, ·6 in. long by ·35 in. broad, slightly grooved at the hilum; testa membranous, brown; cotyledons very thick, unequal. Miq. Fl. Ind. Bat. II. 397; Hook. f. Fl. Br. Ind. III. 628. *L. cuspidata*, Blume Mus. Bot. Lugd.-Bat. I. 112; Miq. l.c. 398. *Melodinus* ? *eugenifolius*, Wall. Cat. 1616.

KEDAH: *Cantley* 230. PENANG: *Wallich* 1616; *Curtis* 1061; *King's Collector* 996A, 1452. PERAK: *Curtis*; *Wray* 629, 630, 3141, 4248; *Scortechini* 1281. SINGAPORE: *Ridley* 2724. — *DISTRIB.* Sumatra (*Teysmann* 4053; *Beccari* 844; *Curtis* 3551; *Forbes* 1586, 2725), Borneo (*Burbridge*, *Beccari* 3246).

2. *LEUCONOTIS* MAINGAYI, Dyer in Herb. Kew.; Hook. f. Fl. Br. Ind. III. 628 (1882). A climbing shrub; branchlets stout, nearly as thick as a goose-quill, nearly black when dry, obtusely quadrangular, the nodes swollen and crossed by a slender ridge joining the bases of the petioles. *Leaves* opposite or in whorls of 3, coriaceous; elliptic-oblong, abruptly and obtusely caudate-acuminate at apex, attenuately rounded at base; shining on the upper surface and very dark brown when dry, paler and dull on the lower; margins recurved; 3 to 5 in. long, 1·5 to 2 in. broad; midrib strong, channelled above, raised beneath; main nerves 6 to 10 pairs, the lowest very near the margin and starting the rather obscure intramarginal looped nerve, to which the others, which start from the midrib at about 60°, gradually curve; secondary nerves none or very few; reticulations obliquely transverse, rather prominent; petiole 1·25 in. long, channelled above by the decurrent margins of the blade, which become connivent. *Cymes* very stout, about as long as the petiole, about 15- to 20-flowered; peduncle very thick, flattened, ·25 to ·5 in. long and ·15 to ·25 in. broad, much enlarging in fruit; branches about 4, these again 2-chotomously branched, very stout, as are the very short (up to ·15 in. long) pedicels; bracts ovate-acute, clasping the branches and bases of the pedicels; buds clavate, the tip conical.



*Calyx*-tube very short, fleshy; lobes 4, ovate, rounded, the two outer broader and shorter than the two inner, which are .2 in. long, all glabrous but very slightly ciliate; glands very many, very minute, in bud scarcely more than papillæ. *Corolla*-tube cylindric, .25 in. long, puberulous at the base within; lobes 4, broadly ovate, recurved, thickly puberulous, the margins incurved slightly. *Stamens* in the upper half of the tube; anthers lanceolate, apiculate, .125 in. long; filaments short, broad. *Ovary* somewhat depressed, 4-grooved, tapering to a broad .1 in. style; stigma rounded with a short apiculus; cells 2, ovules 2 in each cell. *Berry* obovoid, 1.5 to 1.75 in. long by about 1 in. in diam.; pericarp thick, smooth and shining without. *Seeds* about 3, oblong, somewhat flattened, .75 in long by .5 in. broad and .25 in. thick, dark brown; testa very membranous; cotyledons thick, fleshy; radicle cylindric, about .15 to .2 in. long.

SINGAPORE: *Maingay* (K.D.) 935; *Ridley* 2826, 3710, 8908.

3. *LEUCONOTIS GRIFFITHII*, Hook. f. in Fl. Br. Ind. III. 628 (1882). A glabrous climbing shrub; branchlets stout, as thick as a goose-quill, obscurely angled, dark brown when dry with a few pale lenticels, ultimate ones quadrangular. *Leaves* coriaceous; elliptic-oblong, obtusely and abruptly short acuminate at apex, rounded or slightly cuneate at base; upper surface shining, pale olivaceous-brown when dry, lower dull and paler chocolate-brown, often glandular-dotted; margins recurved; 3.5 to 5.5 in. long, 1.5 to 2.25 in. broad; midrib slender, impressed above, sharply prominent beneath; main nerves 5 to 7 pairs, starting at an angle of 70° with the midrib and curving upwards to meet in a faint looped intramarginal nerve, impressed above, raised beneath, fairly conspicuous when dry; secondary nerves few or none; reticulations obliquely transverse; petiole .5 to .75 in. long, bordered by the decurrent margins of the blade, which are connivent. *Cymes* axillary, erect, as long as the petiole; peduncle .5 in. long, somewhat flattened, stout; branches 3 at first, again subdividing, crowded; pedicels quadrangular, .1 to .2 in. long; bracts ovate, acute, sheathing the bases of the joints and pedicels; buds clavate, the tip oblong; flowers yellow. *Calyx* .1 in. long, thick at base; lobes 4, ciliate, the two outer ovate-acute, the 2 inner oblong rounded, all with many small glands at the base within and 1 to 2 fairly large ones. *Corolla*-tube cylindric, .3 to .4 in. long, glabrous except the puberulous lower third inside; lobes broad, blunt, ovate, .15 to .2 in. long. *Stamens* occupying the upper half of the tube; filaments short, broad; anthers linear-lanceolate, apiculate, .125 in. long. *Ovary* conical, 4-angled, glabrous, with an angled style and acute stigma; cells 2-ovuled. *Berry* ellipsoid, 1.5 in. long, 1 in. in diameter; pericarp leathery, smooth, shining. *Seeds* usually 2 only, on a thin

septum and with little pulp, .7 in. long, .4 in. broad; testa membranous; cotyledons very thick, wrinkled on the inner face; radicle small, included between the cotyledons.

PERAK: *Scortechini* 1475; *Wray* 28, 592, 1366, 4009; *King's Collector* 2663, 3080; *Curtis*. MALACCA: *Griffith*; *Maingay* (K.D.) 1050, 1051. SELANGOR; *Ridley* 1963. SINGAPORE: *Kurz*; *T. Anderson* 60; *Ridley* 2735, 9166.

*Ridley's* specimen from Upper Bukit Mandai, Singapore, has dark rough branchlets, smaller leaves with closer main-nerves and less crowded cymes, but does not seem otherwise to differ, at any rate not sufficiently to warrant its being made a variety.

*L. Griffithii* is an india-rubber producer, and the product is said to be good, very probably as good as that of the neighbouring *L. elasticus*, Becc. 'Nelle foreste di Borneo,' pp. 358, 562, fig. 59, and Hook. Ic. Pl. t. 2733.

#### 4. MELODINUS, Forst.

Erect or scandent shrubs. *Leaves* opposite, penninerved, the nerves thin, parallel; reticulations transverse. *Flowers* in terminal trichotomously paniculate cymes or in axillary and condensed cymes, 5- rarely 4-merous, white or pale pink, often sweet-scented. *Calyx* 5-partite, eglandular within. *Corolla* hypocrateriform; tube cylindric, dilated more or less opposite the stamens; the lobes overlapping to the left, entire or fimbriate at the tips; the mouth with thick cleft or lobed scales. *Stamens* 5 or 4, at or below the middle of the tube; anthers included, oblong-lanceolate, cells rounded at the base; filaments short. *Disk* none. *Ovary* 2-celled; style short; stigma thick, bifid; ovules many in each cell, axile. *Fruit* a globose berry; pericarp coriaceous or hard. *Seeds* many, embedded in pulp; albumen fleshy; cotyledons thin, ovate, foliaceous; radicle long.—DISTRIB. India, Malaya, Southern China and Australasia, about 20 species.

Flowers rather large, in terminal paniced cymes; corolla-lobes oblong, rounded, entire (Subgenus I. EUMELODINUS) ..

1. *M. monogynus*.

Flowers small, in short axillary cymes; corolla-lobes dentate at tip, often fimbriate (Subgenus II. PLEUROPHACELUS):—

Leaves chartaceous, both surfaces brown and nearly similar in colour, the lower only slightly paler than the upper:—

Cymes scarcely longer than the petiole, .25 to .5 in. long:—

Corolla-tube thick, not much dilated, lobes bifid, one branch bicuspidate; buds .25 in. long; leaves with 20 to 30 pair main nerves .. .. .

2. *M. orientalis*.

Corolla-tube slender, dilated in middle, lobes bifid, one branch fimbriate-dentate; buds .15 to .2 in. long:—

Leaves rather broad, reaching 2.25 in., main nerves 10 to 15 pairs; cymes many-flowered .. .. .

3. *M. micranthus*.

- Leaves narrow, reaching only 1·25 in. broad, main nerves 18 to 22 pairs; cymes few-flowered .. 4. *M. citrifomis*  
 Cymes longer than the petiole, ·75 to 1 in. long; leaves greenish-brown when dry .. .. 5. *M. perakensis*.  
 Leaves coriaceous, upper surface olivaceous-brown, shining; lower surface paler and dull; cymes scarcely longer than the petioles; corolla-lobes scarcely bifid, much oblique, fimbriate at tip .. .. 6. *M. coriaceus*.

1. *MELODINUS MONOGYNUS*, Roxb. Fl. Ind. II. 56 (1832). A large glabrous climbing shrub; young branches thinner than a goose-quill, smooth, nearly cylindric, dull brown when dry. *Leaves* chartaceous; oblong or oblong-lanceolate, acuminate at apex, cuneate or rounded at base; glabrous on both surfaces, the upper shining, the lower rather dull and paler brown when dry; margins slightly recurved, somewhat crispate when dry; 4·5 to 6 in. long; 1·5 to 2 in. broad; midrib slender, impressed above, raised beneath; main nerves about 20 pairs, slender, at about an angle of 70° with the midrib, very slightly curved to meet an intramarginal looped nerve close to the edge; secondary nerves many, similar to main nerves but thinner, often forked, sometimes with recurrent branches; reticulations transverse, irregular; all faint on both surfaces; petiole ·2 to ·3 in. long, rather stout. *Cymes* terminal, puberulous, reaching 3 in. in length (occasionally more) and 2 to 3 in. in diam.; peduncles 0 to ·75 in. long; branches trichotomous; pedicels variable; bracts of the inflorescence and primary branches leafy, caducous, those at the bases of the branches and pedicels ovate, acute bracteoles 1 to 2, small, obtuse, on the pedicel itself; buds elongate, tip oblong, acute; flowers white, fragrant. *Calyx* campanulate; lobes 5, oblong-orbicular, sometimes emarginate, ciliate, ·15 to ·2 in. long, the margins hyaline. *Corolla*-tube cylindric, ·5 to ·75 in. long, widening upwards, glabrous or slightly puberulous without, densely villous within, above the stamens; lobes oblong-falcate, rounded, ·3 to ·5 in. long, more or less auricled, each with a 2- to 3-lobed glabrous scale near the base; throat with a corona of 5 bifid villous linear-falcate lobes. *Anthers* oblong-lanceolate, ·06 in. long; filaments slender, short. *Ovary* rounded; style slender, ·1 in. long; stigma thick, cylindric, with a sharp bifid apiculus, very gummy, embraced by the anthers. *Berry* globose, smooth, pulpy, reaching 3 in. in diam.; pericarp coriaceous, orange-coloured, smooth. *Seeds* numerous, flattened; integuments 2, outer thick rugose, inner membranous; albumen copious; cotyledons oval. A. DC. Prod. VIII. 329; Wall. Cat. 1603; Wight Ic. t. 394; Bot. Reg. t. 834; Bot. Mag. t. 2527; Hook. f. Fl. Br. Ind. III. 629; Prain Beng. Plants 668. *Echaltium piscidium*, Wight Ic. t. 472, *excl. fig. of fruit*. *Nerium piscidium*, Roxb. Fl. Ind. II. 7, *excl. descr. of fruit*.

PENANG: *Maingay* (K.D.) 1085. PERAK: *Curtis* 1308.—DISTRIB. India (Sikkim Himalaya, Cooch Behar, Assam, Khasia Hills and Sylhet); Timor (*Forbes* 3708). The fruit is edible.

2. *MELODINUS ORIENTALIS*, Blume Bijd. 1026 (1826) and Mus. Bot. Lugd.-Bat. I. 155, fig. LII. A large glabrous climbing shrub; branches smooth, rather slender, with nearly black bark; upper branchlets obscurely angled, glabrous. *Leaves* chartaceous; oblong or elliptic-oblong, obtusely acuminate at apex, acute at base and often unequal; glabrous on both surfaces, upper nearly black and shining when dry, lower chocolate-brown and dull; margins slightly undulate-crepate; 3 to 5.5 in. long, 1 to 2.25 in. broad; midrib slender, slightly impressed above, sharply raised beneath; main nerves about 20 to 30 pairs, at from 60° to 70° with the midrib, curving upwards and branching to meet an obscure intramarginal looped nerve quite close to the margin; secondary nerves hardly distinguishable from main nerves, but rather more slender, sometimes with recurrent branches; reticulations irregular, obscure; petiole .3 to .5 in. long, bordered by the decurrent margins of the blade, which are connivent. *Cymes* axillary, few-(8- to 10-) flowered, crowded, scarcely as long as the petioles; peduncles very short or almost none, stout; bracts ovate-acute, sheathing the branches and the very short (.025 in. long) pedicels, which also bear a pair of rounded bracteoles below the calyx; buds clavate, .25 in. long, tip globose; flowers white. *Calyx* campanulate, thick, .1 in. long; lobes half that length, ovate, rounded, puberulous. *Corolla*-tube thick, cylindric, .2 in. long, dilated opposite the stamens, contracted above and below, puberulous without, and within below the stamens; lobes short, obliquely ovate, bifid, one branch bicuspidate, plicate in bud; throat with 5 thick fleshy 2-lobed scales. *Stamens* inserted in the middle of the tube; anthers lanceolate, apiculate, rounded at base; filaments short, slender. *Ovary* conoidal, ribbed, surmounted by a slender style .05 in. long and obconic above; stigma conical with a bifid apiculus. *Berry* "large, yellow" (*Maingay*), "globose, red" (*Blume*), apparently about 2.5 in. in diameter. *Seeds* oblong, about .8 in. long and .4 in. broad, testa rugose. *Miq.* Fl. Ind. Bat. II. 395, t. xxxiv.; *A. DC.* Prod. VIII. 330; *Kurz* in Journ. As. Soc. Beng. XLVI. ii. 250, *in note*; *Hook.* f. Fl. Br. Ind. III. 629. *Hunteria?* *cuspidata*, *Wall.* Cat. 1609; *A. DC.* l. c. 350. *Alyxia?* *cuspidata*, *Wall.* Herb. *Chilocarpus cuspidatus*, *Benth.* in Gen. Pl. II. 698 (under *Hunteria*).

PENANG: *Wallich* 1609; *Phillips*; *Maingay* (K.D.) 1043/2 (*Chilocarpus suaveolens*); *Curtis* 738, 2838. PERAK: on Maxwell's hill, 3000 ft. *Scortechini* 355; at Goping, *King's Collector* 4530. DISTRIB. Java, Sumatra (*Forbes* 1568).



3. *MELODINUS MICRANTHUS*, Hook. f. in Fl. Br. Ind. III. 629 (1882). A climbing shrub (apparently); branchlets rather slender, terete, with nearly black bark, uppermost somewhat angular. *Leaves* chartaceous; oblong-lanceolate, obtusely acuminate at apex, attenuate at base; smooth and shining and dark reddish-brown on both surfaces when dry, the lower rather paler than the upper; margins recurved, slightly undulate; 3 to 6 inches long, 1 to 2.25 in. broad; midrib slender and impressed above, more conspicuous and raised beneath; main nerves 10 to 15 pairs, slender, remote, at an angle of from 50° to 60° with the midrib, and curving slightly upward to an obscure intramarginal nerve just within the edge, impressed above; secondary nerves few; reticulations transverse, oblique; petiole .15 to .25 in. long, slender. *Cymes* many-flowered, axillary, trichotomous, about .5 in. long; peduncles .2 in. long, rachis angular; bracts very small, ovate-acute, with ciliate hyaline tips; pedicels .05 to .075 in. long, with two bracteoles near the base of the calyx; buds clavate, tip conical-globose, .15 in. long. *Calyx* .075 in. long; tube about one-third of length; lobes ovate, rounded. *Corolla*-tube cylindric, dilated a little above the middle, constricted above and below, .125 in. long, pubescent within in a ring below the stamens; lobes short, unequally obtusely 2-lobed, twisted to the right; the base furnished with fleshy bifid scales closing the mouth. *Anthers* lanceolate, long-apiculate, .05 in. long; filaments very short. *Ovary* globose; style slender; stigma conical, with a short bifid apiculus. *Fruit* not seen.

PENANG: road to Sungie Penang, *Curtis* 1053. MALACCA: *Maingay* (K.D.) 1090.

4. *MELODINUS CITRIFORMIS*, King & Gamble, n. sp. A slender glabrous climbing shrub; young branches rather thicker than a crow-quill, dull brown when dry, with elongate lenticels. *Leaves* chartaceous; oblong-lanceolate, obtusely and often obliquely caudate-acuminate at apex, cuneate at base; both surfaces glabrous, dull olivaceous-brown when dry; margin slightly crisped; 3 to 4 in. long, 1 to 1.25 in. broad; midrib slender; main nerves 18 to 22 pairs, at rather irregular angles but usually at about 70° with the midrib, fairly straight, meeting an intramarginal nerve at less than .05 in. from the margin, faint on both surfaces when dry; secondary nerves many, irregular, alternate with the main nerves, recurrent and forked to form the inconspicuous reticulations; petiole .25 in. long. *Cymes* axillary, few-flowered, scarcely longer than the petiole; peduncle and pedicels very short, with many ovate obtuse bracteoles, which, however, scarcely imbricate; buds clavate, .2 in. long, tip globose; flowers light yellow. *Calyx* .05 in. long, campanulate; lobes very short, obtuse, hyaline on the margins. *Corolla*-

tube cylindric, dilated in the middle rather below the stamens, contracted above and below, glabrous except a ring of hairs within under the stamens, .125 in. long, with 5 lobed fleshy scales closing the throat; lobes angled, falcate, fimbriate at the tip, the tip inflexed when open. *Anthers* lanceolate, apiculate, .05 in. long; filaments short, pubescent at base. *Ovary* conoidal, tapering to a short style and oblong conical stigma, with a pale band at its base. *Berry* ovoid, orange, 3 to 3.5 in. long, 2.5 in. in diameter; pericarp smooth, shining, rather thin. *Seeds* numerous, embedded in pulp, roughly oblong, .6 in. long, .4 in. broad, with no apparent aril; testa thick, granular, brown, deeply pitted; albumen waxy or fleshy; cotyledons oblong, .125 in. long, flat; radicle thick, cylindrical, .275 in. long.

PERAK: in dense jungle at 500 to 800 feet, near Larút, *King's Collector* 6525.

5. *MELODINUS PERAKENSIS*, King & Gamble, n. sp. A glabrous climbing shrub; young branches thicker than a crow-quill, cinereous-brown, uppermost obscurely quadrangular. *Leaves* chartaceous; elliptic or elliptic-oblong, shortly and obtusely acuminate at apex, attenuate at base; both surfaces pale greenish-brown when dry, the upper somewhat shining and darker than the lower; margins slightly recurved; 3.5 to 5 in. long, 1.5 to 2 in. broad; midrib slender, slightly impressed above, raised beneath; main nerves slender, 10 to 15 pairs, starting at about 60° with the midrib and curved upwards to and along the margin where they meet, forming a slightly broken wavy obscure intramarginal nerve; secondary nerves few; reticulations irregular, very faint, only the main nerves easily visible; petiole .15 to .2 in., stout. *Cymes* axillary, .75 to 1 in. long, lax, sessile; branches and .1 to .2 in. long pedicels slender; bracts ovate-acute, in pairs at the branches and below the pedicels with 1 to 2 obtuse bracteoles on the pedicel; buds clavate, .2 in. long, tips globose; flowers waxy-white. *Calyx* .05 in. long, campanulate; lobes broadly ovate, ciliate. *Corolla*-tube cylindric, slightly inflated in the middle opposite the stamens, narrowed at the throat; lobes oblong-spathulate, spreading, the apex lobed, one lobe fimbriately toothed; a large rounded gland at the base of each lobe, in the throat of the tube. *Anthers* lanceolate, cordate at base; filaments short, slender. *Ovary* broadly ovate; style slender; stigma conical with a bifid apiculus. *Fruit* pyriform, about 2 in. long by 1.5 in. broad; pericarp thin but woody, smooth. *Seeds* many, roughly triangular, .75 in. long; testa dark brown, rugose, crustaceous, deeply pitted.

PERAK: in open jungle on limestone hills, at 300 to 800 feet, *King's Collector* 4481, 7031.

6. *MELODINUS CORIACEUS*, Oliver in Hook. Ic. Pl. t. 1758 (1888).

A large climbing shrub; branchlets as thick as a swan's-quill, dark reddish-brown, rough, uppermost internodes flattened or angled and with vertical lines; nodes raised and with a slight ridge. *Leaves* coriaceous; elliptic or obovate or oblong-oblancheolate, obtuse or very slightly acute at apex, cuneate at base; upper surface olivaceous-brown, shining, lower much paler and dull, grey when dry; margins recurved; 3 to 5 in. long, 1·5 to 2 in. broad; midrib prominent, impressed above, raised beneath; main nerves 13 to 17 pairs, at about 60° to 70° with the midrib, nearly straight to join an obscure intramarginal nerve; secondary nerves recurrent, branching into reticulations, all fairly distinct on the upper, indistinct on the lower surface; petiole ·3 to ·5 in. long, channelled above. *Cymes* axillary, sessile, as long as or slightly longer than the petioles, many-flowered; rachis angular; bracteoles ovate, acute, ciliate; pedicels stout, ·05 in. long, much enlarged in fruit; buds clavate, with globose tip, ·25 in. long. *Calyx* ·05 to ·075 in. long; lobes half the length, ovate, acute, ciliate. *Corolla*-tube cylindric, constricted at the mouth and near the base, dilated between, opposite the stamens, pubescent within in a ring below the stamens, glabrous without, mouth furnished with 5 2-lobulate fleshy appendages which nearly close it; lobes ovate, falcate, very oblique, the tips fimbriate-dentate turned to the right. *Anthers* near the top of the tube, sagittate, apiculate, ·06 in. long; filaments short. *Ovary* globose, style slender; stigma conical, with a short bifid apiculus, very gummy. *Berry* ovoid or globose, 1·5 to 2·5 in. in diam.; pericarp yellowish, shining, tubercular. *Seeds* many, of irregular shapes, usually ovate pyriform; testa granular, rugose, much pitted; albumen waxy, deeply pitted by the ridges of the testa; cotyledons small, oblong, ·125 in. long; radicle cylindrical, ·25 in. long. *Alyxia* ? *coriacea*, Wall. Cat. 9065, and in Roxb. Fl. Ind. ed. Carey & Wall. II. 540; Hook. f. Fl. Br. Ind. III. 635. *Hunteria* ? *coriacea*, Wall. Cat. 1610.

PENANG: Wallich 1610, 9065; at Chalet, 1000 feet, Curtis 1040. PERAK: open jungle near Larút, King's Collector 7499; Waterfall Hill, Wray 2074.

## Tribe II.—PLUMERIEÆ.

### Subtribe 1.—RAUWOLFIINÆ.

#### 5. ALYXIA, Br.

Shrubs, sometimes scandent, usually glabrous. *Leaves* coriaceous, in verticils of 3 to 4, rarely opposite; the nerves more or less faint. *Flowers* rather small, in small axillary or terminal cymes. *Calyx* short, 4- to 5-partite, eglandular within. *Corolla* hypocrateriform; tube cylindric, slightly expanded opposite the stamens, throat naked;

lobes 5, slightly twisted, overlapping to the left. *Stamens* inserted above the middle of the tube; anthers lanceolate, their bases rounded. *Disk* none or obscurely annular. *Ovary* of 2 distinct carpels; style filiform; stigma oblong, urceolate or capitate, pointed or somewhat bifid; ovules 2 to 6 in two series in each carpel. *Fruit* of 1 or 2 drupes often pedicellate; drupes 1-seeded or with 2 to 4 one-seeded joints. *Seeds* ovoid or oblong, grooved or concave on the ventral surface at the attachment to the placenta; albumen horny, deeply ruminate, presenting horizontal parallel lamellæ; cotyledons thin, leafy, ovate or oblong, straight or curved; radicle long, thick.—**DISTRIB.** Tropical Asia, Australia, and Polynesia; about 30 to 35 species.

Drupes .5 in. long or under:—

Corolla pubescent without; leaves pubescent beneath .. 1. *A. pilosa*.

Corolla glabrous without; leaves usually glabrous beneath:—

Leaves coriaceous:—

Leaves mostly over 2 in. long:—

Main nerves 16 to 20 pairs at an angle of 60° to 70°  
with midrib .. .. 2. *A. lucida*.

Main nerves 25 to 40 pairs at an angle of 80° with  
midrib .. .. 3. *A. odorata*.

Leaves mostly under 2 in. long:—

Main nerves 10 to 12 pairs at right angles to midrib .. 4. *A. oleifolia*.

Main nerves 15 to 20 pairs at 75° to 80° with midrib .. 5. *A. pumila*.

Leaves chartaceous, 2.5 to 5 in. long, main nerves 27 to 30  
pairs .. .. 6. *A. Forbesii*.

Drupes over .5 in. long:—

Leaves thinly coriaceous, 4 to 6 in. long, main nerves extremely numerous; drupes 1 in. long .. 7. *A. Seortechinii*.

Leaves coriaceous, 3 to 4 in. long, main nerves 25 to 30 pairs;  
flower not known; drupe .75 in. long .. 8. *A. selangorica*.

1. *ALYXIA PILOSA*, Miq. Fl. Ind. Bat. II. 408 (1856). A slender climbing shrub; branches stout with pale bark; branchlets thinner than a goose-quill, angled, striate, dull brown, covered, especially the extremities, with dense minute grey tomentum. *Leaves* very coriaceous, opposite or more often in whorls of 3 to 4; lanceolate or elliptic-lanceolate, shortly acuminate at apex, cuneate or acuminate narrowed at base; upper surface shining olivaceous, lower pale yellowish-olivaceous densely short-pubescent; margins cartilaginous, recurved; 3 to 5 in. long, 1 to 1.5 in. broad; midrib very stout, very prominent on the under surface, impressed on the upper; main nerves 15 to 20 pairs, almost at right angles to the midrib, faintly depressed on the upper surface when dry, broad and pale on the lower; secondary nerves many, very indistinct, as are the reticulations; petiole .25 to .35 in. long, thick, bordered by the decurrent margins of the blade. *Cymes* axillary,



densely grey-pilose, reaching .75 to 1 in. in length; peduncles stout, .25 in. long; flowers subumbellately crowded; bracts at the bases of the umbels lanceolate, .15 in. long; bracteoles smaller, three on each pedicel, which is scarcely .1 in. long; buds clavate, the tip ovate-acute; flowers yellowish-white (?). *Calyx* deeply cleft, .15 in. long; lobes ovate-lanceolate, densely pubescent. *Corolla*-tube cylindric, dilated near the top opposite the stamens, contracted at the mouth which bears inside an annular ring, .4 in. long, pubescent without and below the stamens within; lobes ovate-cordate, glabrous within, .15 in. long. *Anthers* elliptic lanceolate, apiculate, .06 in. long; filaments slender. *Ovary* (or the thin lobed disk surrounding and attached to it) densely villous; carpels 2; style slender, .25 in. long; stigma cylindric, with a bifid very short apiculus. *Fruit* of 1 or 2 pedicellate oblong-ellipsoid drupes, .5 in. long, .35 in. broad, tipped with the persistent base of the style; pericarp smooth, thin, wrinkled when dry. *Seed* 1, oblong, conform to the pericarp, furrowed on one side where it is attached to the placenta; testa membranous; albumen horny, deeply ruminant in closely packed horizontal lamellæ; cotyledons small, oblong; radicle long, cylindric. Hook. f. Fl. Br. Ind. III. 635.

PERAK: in dense jungle near the top of Gunong Malacca, at 3,500 to 4,000 feet, *King's Collector* 7170. MALACCA: on Mount Ophir, *Lobb*.—DISTRIB. Sumatra, Borneo (*Teysmann*, *Beccari* 1685, 2121).

*Lobb's* specimen has the leaves somewhat obovate, obtuse and almost emarginate at apex, but otherwise seems to be the same as the Peninsular and Sumatran specimens.

2. *ALYXIA LUCIDA*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 540 (1824). A glabrous twining shrub; branches stout dark greyish-brown, sparsely lenticelled; branchlets quadrangular, grey to reddish-brown, shining. *Leaves* pergamaceous, opposite or in whorls of three, in young branches of four; elliptic or obovate, obtuse or bluntly acute at apex, cuneate at base; glabrous on both surfaces, the upper shining, olive-green when dry, the lower dull and pale; margins cartilaginous, recurved; 1.75 to 3.5 in. long, 1 to 1.25 in. broad; midrib slender, impressed above, raised beneath; main nerves 16 to 20 pairs, slender, at 60° to 70° with the midrib, straight to join an intramarginal nerve at .05 in. from the edge or nearer, indistinct on both surfaces, less so on the lower; secondary nerves many, between and similar to the main nerves, often branched; reticulations obscure; petiole .1 to .3 in. long, stout, bordered by the decurrent margins of the blade. *Cymes* axillary, trichotomous, corymbosely subumbellate, puberulous, reaching .75 in. long; peduncles angular, about .2 in. long; pedicels slender, .1 in. long; bracts linear-subulate, acute; bracteole on the pedicel, rounded; buds

clavate .3 in. long, the tip ovate; flowers yellowish-white, fragrant. *Calyx* deeply 5-cleft; lobes linear, acute, .06 in. long, pubescent, ciliate on the margins. *Corolla*-tube narrowly cylindric, slightly dilated near the top opposite the stamens, contracted at the throat which is naked but furnished with an annular fold within, glabrous without, puberulous below the stamens within; lobes oblong, broad, .125 in. long, recurved. *Stamens* inserted below the throat of the tube; anthers lanceolate, .05 in. long; filaments as long, slender. *Disk* of 5 minute very villous scales, surrounding the ovary and almost adherent. *Ovary* of 2 distinct carpels, ovoid, glabrous; style .15 to .2 in. long, very slender; stigma oblong, apiculus bifid. *Fruit* of 1 or 2 pedicellate drupes; the pedicels .3 to .5 in. long; drupes .5 in. long, .3 in. broad, ellipsoid, shortly apiculate; pericarp thin, striate. *Seed* solitary, .3 to .5 in. long, .2 to .3 in. broad, ellipsoid, deeply cleft on one side where it is attached to the placenta; testa membranous; albumen horny, deeply ruminate, and presenting closely packed horizontal lamellæ; cotyledons flat, oblong, .075 to .1 in. long; radicle cylindric, stout, .15 in. long. Hook. f. Fl. Br. Ind. III. 635. *A. Gynopogon*, Syst. Veg. IV. 440; Wall. Cat. 1605. *A. quinata*, Miq. Fl. Ind. Bat. II. 407, *vide* Stapf in Trans. Linn. Soc. Ser. 2, IV. 207.

KEDAH: at Gunong Raya, *Curtis* 2547. PENANG: *Curtis* 2881, 3088. PERAK: *Ridley* 7177; *Cantley*. DINDINGS: Pangkor, at Rajah Itam, *Curtis* 1622. MALACCA: cultivated, *Maingay* (K.D.) 1054. SINGAPORE: *Wallich* 1605; *Murton* 12; *Ridley* 1801, 4427, 8905.—DISTRIB. Sumatra, Borneo (*Haviland* 2176, flowers rather longer than type).

3. *ALYXIA ODORATA*, Wall. Cat. 1606 (1829). A climbing shrub, with smooth very dark brown bark; young branches thinner than a goose-quill, 4-angled, shining, dark red-brown when dry. *Leaves* coriaceous, opposite or in whorls of 3 to 4; oblanceolate or oblong-oblanceolate, obtuse or subacute at apex, narrowed at the base; both surfaces glabrous, pale brown when dry, the upper shining, the lower rather dull; margins recurved; 2 to 5 in. long, 1 to 1.5 in. broad; mid-rib stout, impressed above, raised and sharp beneath; main nerves extremely numerous, perhaps 25 to 40 in number, but difficult to distinguish from the equally numerous secondary nerves, which are branched and often recurrent, usually at an angle of 80° with the mid-rib and straight to join an intramarginal nerve close to the edge, raised but faint on the upper surface, almost invisible on the lower; petiole .2 to .3 in. long, bordered by the decurrent margin of the blade. *Cymes* axillary, about .5 in. long, including the short angled peduncle, few-flowered; pedicels .06 in. long, angular, pubescent; bracts lanceolate;

buds clavate, .3 to .4 in. long, tip ovate. *Calyx* campanulate, .1 in. long; lobes 5, linear-lanceolate, pubescent. *Corolla*-tube cylindric, dilated near the top opposite the stamens, contracted at the throat which is annulate within, glabrous outside, pubescent within, .4 in. long; lobes ovate, broadly obtuse, recurved, .125 in. long. *Anthers* narrowly ovate; filaments short, slender. *Disk* none or so appressed to the ovary as to be indistinguishable, white-villous. *Ovary* of 2 rounded carpels; style very slender, .3 in. long; stigma capitate. *Fruit* of 2 or 1 ellipsoid, long- (up to .4 in.) pedicelled drupes, often 2-seeded by superposition; each drupe .4 to .5 in. long, .3 in. broad; pericarp ribbed, furrowed on one side opposite the placenta. *Seed* conform to the drupe; testa membranous, separated; albumen deeply ruminate in horizontal lamellæ.

MALACCA: *Griffith*. SINGAPORE: at Sungei Morai, *Ridley* 4427, 5659.—DISTRIB. Burma (Tenasserim, *Wallich* 1606).

*Ridley's* specimens show smaller leaves than those of the type, of which there is only one specimen, *viz.* in the Wallichian Herbarium at the Linnean Society, but the shape and nervation agree, as does the bark of the twigs. The Wallichian specimen and *Griffith's* being in fruit only, the description of the flowers is taken from *Ridley's*.

4. *ALYXIA OLEIFOLIA*, King & Gamble, n. sp. A small climbing or epiphytic shrub; branchlets rather thick, boldly angled, with smooth pale brown bark, minutely rugose and puberulous; nodes swollen and ridged. *Leaves* thickly coriaceous, opposite or in whorls of three; elliptic or elliptic-lanceolate sometimes almost rhomboid, acute at apex or slightly blunt-acuminate, narrowed at base; upper surface shining, dark olivaceous, lower surface dull yellowish-olivaceous, both surfaces glabrous, lower sometimes punctulate; margins much recurved when dry; 1.5 to 2.5 in. long, .75 to 1.25 in. broad; midrib very stout and broad, much impressed above and raised beneath; main nerves 10 to 12 pairs, at right angles to the midrib, often forked, depressed above, invisible beneath; secondary nerves many, very obscure; reticulations invisible; petiole stout, .15 to .25 in. long, wrinkled, bordered by the decurrent margins of the blade. *Cymes* subterminal and axillary, reaching about 1 in. in length, glabrous, few-flowered; peduncles .3 to .5 in. long, angular, as are the branches; pedicels short; bracteoles linear-subulate, similar to the calyx-lobes; buds clavate, .4 to .5 in. long, tip ovate. *Calyx* campanulate, deeply 5-lobed; lobes linear-subulate, .1 in. long, ciliate. *Corolla*-tube cylindric, slightly dilated opposite the stamens, contracted at the mouth which is annulate within, glabrous except slight pubescence below the stamens within; lobes ovate, obtuse, erect or slightly recurved, .15 in. long. *Anthers*

ovate-lanceolate, .05 in. long; filaments slender. *Disk* of 5 densely villous scales surrounding the ovary. *Ovary* of 2 rounded carpels, puberulous; style slender; stigma globose with a bifid apiculus; ovules 1 in each cell. *Fruit* of 1 or 2 very shortly pedicellate ellipsoid drupes, each drupe about .5 in. long and .35 in. broad; pericarp crustaceous, striate, slightly furrowed on one side opposite the placenta, transversely ridged within. *Seed* 1, grooved on one side where it is attached to the placenta, .4 in. long, .25 in. broad; testa membranous; albumen horny, deeply ruminant in horizontal lamellæ; cotyledons ovate, .1 in. long; radicle cylindric, thick, .15 in. long.

PERAK: in the mountains, at 4,500 to 5,500 feet, *Wray* 230, 3846, 4116; *Scortechini*; *King's Collector* 7405; *Cantley*, at Gunong Bubu, 5,040 feet.

5. *ALYXIA PUMILA*, Hook. f. Fl. Br. Ind. III. 635 (1882). A small climbing shrub; branchlets as thick as a crow-quill, angled, reddish-brown, minutely rugose, innovations with deciduous pubescence. *Leaves* coriaceous, opposite or in whorls of 3; narrowly elliptic or ovate- or lanceolate-elliptic, acute or shortly subacuminate at apex, cuneate at base or slightly rounded; both surfaces glabrous except when very young, upper shining dark olivaceous, lower dull and pale almost yellowish; margins recurved; .75 to 2 in. long, .35 to .75 in. broad; midrib rather slender, impressed above, raised beneath; main nerves 15 to 20 pairs, at from 75° to 80° with the midrib, very faint on the upper surface, invisible on the lower; secondary nerves few, faint, reticulations invisible; petiole .1 to .15 in. long, stout, bordered by the decurrent margins of the blade. *Cymes* short, axillary, 5- or 6-flowered, on .25 in. long peduncles. *Calyx* deeply 5-lobed; lobes linear, ciliate, .05 in. long. *Corolla*-tube cylindric below, dilated near the top opposite the stamens, then constricted above, .2 in. long, glabrous without, pubescent within below the stamens; lobes ovate, .05 in. long, glabrous, spreading; throat not annulate. *Anthers* lanceolate, acute, rounded at base, .04 in. long. *Disk* 5-lobed, white-villous. *Ovary* 2-carpelled; style slender; stigma oblong. *Fruit* of 2, usually 1, short-pedicelled ellipsoid drupes, each about .4 in. long, .3 in. broad; pericarp crustaceous, shining, grooved on one side. *Seed* conform to the drupe, grooved on one side at the attachment to the placenta; testa thin, separated; albumen horny, ruminant in flat lamellæ.

KEDAH: at Gunong Jerai, *Ridley* 5504. PERAK: top of Batu Kusan, *Scortechini* 1621. MALACCA: *Maingay* (K.D.) 1053; on Mount Ophir, *Ridley* 10094; *Lobb*.

6. *ALYXIA FORBESII*, King & Gamble, n. sp. A climbing shrub; branchlets as thick as a crow-quill, 3-angled, pale brown, shining,



glabrous; the nodes slightly swollen, ridged. *Leaves* chartaceous, opposite or in whorls of 3 to 4; lanceolate, oblong-lanceolate or elliptic-lanceolate, obtusely rather long-acuminate at apex, cuneate at base; both surfaces glabrous, green when dry, the lower slightly paler and dull; margins very slightly recurved, thinly cartilaginous; 2·5 to 5 in. long, .75 to 1·5 in. broad; midrib slender but prominent, impressed above, raised beneath; main nerves very numerous, 27 to 30 pairs, at an angle of about 80° with the midrib, slender, straight to join a slender intramarginal nerve less than .05 in. from the edge, difficult to distinguish from the very numerous, often branching, secondary nerves; reticulations irregular, all nerves rather faint on the upper, very obscure on the lower surface; petiole .05 to .1 in. long, bordered by the decurrent, usually connivent margins of the blade. *Cymes* axillary, slender, lax, glabrous, 3- to 5-flowered, reaching in all about 1 in. in length; peduncles .25 in. long; pedicels very slender, .1 to .15 in.; bracts 0 or linear, leafy, caducous; buds clavate, .5 in. long, tip ovate; flowers white. *Calyx* shortly campanulate, deeply 5-lobed; lobes ovate-acute, spreading, .1 in. long. *Corolla*-tube cylindric, .4 to .6 in. long, slightly dilated near the top opposite the stamens, contracted at the throat, which is annulate within, glabrous except the upper part within; lobes ovate-cordate, .15 to .2 in. long, recurved. *Anthers* lanceolate, rounded at base; filaments short, slender. *Disk* undulately 5-lobed, white-villous, enclosing the ovary. *Ovary* of 2 rounded glabrous carpels; style very slender; stigma globose, with a bifid apiculus. *Fruit* of 1 or 2 ellipsoid drupes on very short pedicels, each drupe .4 to .5 in. long and .3 in. broad, grooved on one side opposite the placenta; pericarp thin, almost membranous. *Seed* 1, conform to the drupe; testa membranous; albumen horny, deeply ruminant; cotyledons oblong, .15 in. long; radicle stout, .1 in. long, the base oblique. *A. stellata*, Wall. Cat. 1604; Hook. f. Fl. Br. Ind. III. 636 (*not of* Roem. and Sch.). *Gynopogon stellatum*, Kurz in Journ. As. Soc. Beng. XLVI. ii. 251, and For. Fl. II. 176 (*not of* Labill.).

PENANG: Wallich 1604. PERAK: at Gunong Iras, 4,000 feet, Wray 4165; on Larut Peak, 3,000 to 4,000 feet, King's Collector 2124; *Scortechini*. PAHANG: at Kluang Terbang, W. D. Barnes 10898.—DISTRIB. Sumatra (*Forbes* 2268; on Mount Dempo, at 4,000 to 5,000 feet, 2256); Java (*Forbes* 1043).

On following up the suggestion made in the Fl. Br. Ind. that this plant is not identical with the Polynesian *A. stellata*, we feel bound to agree, and consider it best to give it a new name.

7. *ALYXIA SCORTECHINII*, King & Gamble, n. sp. A climbing shrub; young branches thinner than a goose-quill, pale brown, shining, angled,

minutely rusty-puberulous, nodes swollen. *Leaves* thinly coriaceous, in whorls of 3 or opposite; oblong-ob lanceolate, shortly cuspidate-acuminate at apex, narrowed at the base from above the middle; upper surface dark-olivaceous, glabrous, shining when dry, lower surface almost dull, paler and in young leaves minutely puberulous especially along the midrib; margins thin, slightly recurved; 4 to 6 in. long, 1.5 to 2 in. broad; midrib stout, impressed above, raised beneath; main nerves extremely numerous, probably more than 50, but difficult to distinguish from similar secondary nerves, usually at an angle of 80° with the midrib, straight to join an intramarginal nerve at a little less than .05 in. from the edge, much branched recurrently, raised on the upper surface; reticulations in a minute network; petiole .3 to .5 in. long, transversely corrugated when dry and bordered by the decurrent edges of the blade. *Cymes* sessile, axillary, densely crowded, about twice as long as the petioles; bracts numerous, linear-lanceolate, pubescent; pedicels very short, bracteolate below the calyx; buds clavate, .5 in. long, tip oblong obtuse. *Calyx* .15 in. long, campanulate, deeply cleft in 4 to 5 linear lobes, .1 in. long, pubescent outside, glabrous within. *Corolla*-tube cylindric, dilated near the top opposite the stamens, contracted at the mouth, which is annulately folded within, pubescent within and on the upper half without, .4 in. long; lobes 4 to 5, ovate, erect or recurved, pubescent, margins incurved, .15 in. long. *Anthers* ovate-lanceolate, apiculate, .05 in. long; filaments slender. *Disk* villous, appressed to the ovary. *Ovary* of 2 conical carpels; style very slender, .3 in. long; stigma minute, capitate. *Fruit* of 2, more usually 1, ellipsoid, long-pedicelled drupes, about 1 in. long and .5 in. broad; pericarp ribbed when dry, especially opposite the placenta. *Seed* conform to the drupe; albumen ruminant; cotyledons oblong; radicle cylindric, rather long.

PERAK: *Scortechini*; at lower camp, Gunong Batu Poteh, Wray 1091; at Kwala Kangsa, *Ridley* 2895.

Ridley's specimen is the only one with fruit and its leaves are rather thinner than those of the other specimens, but otherwise it corresponds well enough. To this species probably also belong Burbidge's specimens in leaf only from Borneo, and Beccari's No. 333 from Sumatra, all in the Kew Herbarium.

#### SPECIES IMPERFECTLY KNOWN.

8. *ALYXIA SELANGORICA*, King & Gamble, n. sp. A slender climbing shrub; branchlets the size of a crow-quill, pale brown, shining, angled. *Leaves* coriaceous, opposite or in whorls of 3 to 4; obovate or oblanceolate, shortly and abruptly acuminate at apex, long cuneate at base;

olivaceous and shining on the upper surface, dull and rather paler and minutely rusty-puberulous on the lower; margins recurved; 3 to 4 in. long, 1 to 1·25 in. broad; midrib stout, impressed above, raised beneath; main nerves very many, 25 to 30 or more, difficult to distinguish from the similar but rather fainter secondary nerves, these latter recurrent-branched, all meeting an obscure intramarginal nerve, nearly at right angles to the midrib, obscure on both surfaces but slightly raised on the upper; petiole ·25 in. long, rusty-pubescent, bordered by the decurrent margins of the blade. *Flowers* not known, but fruiting cymes axillary, scarcely longer than the petiole, few-flowered. *Fruit* of 1 or 2 long-pedicelled drupes; pedicels ·3 to ·4 in. long; drupes oblong ellipsoid, acute at both ends, ·75 in. long, ·35 to ·45 in. broad; pericarp black and wrinkled when dry. *Seed* conform to the drupe but rounded at the ends, grooved on one side where it is attached to the placenta; testa thin, separated; albumen horny, much ruminant in horizontal lamellæ; cotyledons oblong, ·2 in. long, ·075 in. broad; radicle stout, cylindric, ·225 in. long.

SELANGOR: at Gua Batu, *Ridley* 8558.—DISTRIB. Sumatra (*Forbes* 3212).

# 6. RAUWOLFIA, Linn.

Trees or shrubs, glabrous or rarely pubescent. *Leaves* 3- to 4-nately whorled or opposite (rarely); nerves slender. *Flowers* in corymbose or umbellate cymes, usually compound, alternate with the terminal leaves or axillary to the upper leaves. *Calyx* short, 5-lobed, eglandular. *Corolla*-tube cylindric, sometimes dilated opposite the stamens, constricted at the mouth, the throat usually hairy within; lobes 5, broad, overlapping to the left. *Stamens* included in the corolla-tube above the middle; filaments short; anthers small, acute, rounded at base. *Disk* cup-shaped or annular. *Carpels* 2, distinct or connate; style filiform; stigma broad, calyptriform or peltate; ovules 2, collaterally placed, in each carpel. *Fruit* of 2 connate or distinct drupes, each with a crustaceous 1-seeded pyrene. *Seeds* ovate; testa thin; albumen thin, fleshy; cotyledons flat; radicle large, superior.—DISTRIB. About 50 species, chiefly tropical American; about 10 from India and the Malay Peninsula and islands.

Corolla-tube cylindric, inflated opposite the stamens; carpels distinct; pyrenes flattened; leaf-nerves rather distant (Subgenus I. OPHIOXYLON)	..	..	..	1. <i>R. perakensis</i> .
Corolla-tube campanulate, not inflated opposite the stamens; carpels connate; pyrenes rounded and beaked; leaf-nerves many, close (Subgenus II. CYRTOSIPHONIA)	..	..	..	2. <i>R. sumatrana</i> .

1. *RAUWOLFIA PERAKENSIS*, King & Gamble, n. sp. A small shrub; branchlets somewhat fleshy, pale brown, as thick as a goose-quill, sparsely lenticellate. *Leaves* fleshy in texture when green, membranous when dry; opposite or whorled, variable in size, glabrous; lanceolate or spathulate, rather long acuminate at apex, narrowly attenuate at base; bright green above turning dark brown when dry, greyish-green beneath turning buff; 4 to 8 in. long, 1 to 3 in. broad; midrib broad, often sinuous when dry; main nerves 12 to 15 pairs, pale, starting from the midrib nearly at right angles and curved upwards to and along the margin; secondary nerves and reticulations obscure; petiole slender, .5 to .75 in. long. *Cymes* corymbose, long-peduncled, 1 to 4 together from the axils of upper leaves; peduncle 1.5 to 3.5 long; branches dichotomous, ultimate ones subumbellate; pedicels slender, .1 in. long, .25 in. fruit; bracts minute, triangular, caducous. *Calyx*-lobes ovate-acuminate, .06 in. long, glabrous. *Corolla*-tube slender, .3 to .5 in. long, tubular, inflated towards the top, glabrous on both sides; lobes ovate, blunt, about .1 in. long. *Disk* annular, .04 in. long. *Stamens* short, blunt; anthers as long as the filaments. *Ovary* rounded; style filiform .15 to .2 in. long; stigma cylindric-calyptiform. *Drupe*s crimson, connate only at the base, obliquely ovate, .5 in. long, .25 in. broad, flattened; exocarp fleshy. *Pyrenes* crustaceous, prominently rugose; albumen thin; cotyledons ovate; radicle as long as cotyledons, together .25 to .3 in. long.

PERAK: *Scortechini* 920, 1161, 8410; *Wray* 3692; *Ridley* 2898, 5523. PAHANG: *Ridley* 1166.

This species is very near *R. densiflora*, Benth., of Ceylon, S. India, and the Khasia Hills, but differs in the much shorter calyx-lobes, the narrower corolla-tube, and the flattened drupes. From *R. serpentina*, Benth., it differs in the veins of the leaves starting nearly at right angles instead of obliquely, and in the larger, usually more separated and flatter drupes and more pitted pyrenes

2. *RAUWOLFIA SUMATRANA* Jack Mal. Misc. 22 (1820). A small tree reaching 40 to 50 feet in height, and 6 to 10 in. in diameter, with erect stout branches and milky juice; branchlets more or less quadrangular, lenticellate. *Leaves* pergamaceous, opposite or verticillate, generally in threes, sometimes in fours, elliptic-oblong to obovate-spathulate, shortly acute or acuminate at apex, long-attenuate at base; margins entire, slightly reflexed; both surfaces glabrous, the lower pale; 6 to 8 in. long, 2 to 3 in. broad; midrib slender, very prominent, impressed above, much raised beneath; main nerves parallel, 32 to 35 pairs, nearly at right angles (80°) to the midrib, then straight, joining in a looped intra-marginal nerve near the edge; secondary nerves similar but fainter, usually one only between each pair of main nerves; reticulations very



few; petiole  $\cdot 75$  to 1 in. long, slightly winged by the decurrent margins of the blade. *Flowers* in terminal compound umbels; primary peduncles 3 to 5, stout, 3 to 4 in. long; secondary peduncles 6 to 8, 1 to  $1\cdot 5$  in. long; tertiary peduncles 3 to 5, about  $\cdot 5$  in. long; quaternary peduncles and pedicels slender,  $\cdot 1$  to  $\cdot 25$  in. long, umbellules of about 4 to 6 flowers; bracts subulate, recurved; bracteoles very minute; buds subglobose, flowers white. *Calyx*-lobes imbricate, nearly orbicular,  $\cdot 05$  in. long on a tube of same length. *Corolla*-tube campanulate,  $\cdot 2$  in. long; lobes rounded, recurved,  $\cdot 05$  to  $\cdot 1$  in. long; tube tufted-pubescent within at the mouth and a little below it; lobes short, rounded,  $\cdot 075$  in. long. *Anthers* sagittate mucronate,  $\cdot 04$  in. long; filaments very short. *Disk* thick, short, barely  $\cdot 025$  in. long, obscurely 5-lobed. *Ovary* 2-celled, furrowed; style slender,  $\cdot 1$  in. long; stigma peltate; cells 2-ovuled. *Drupe* oblong-globose, smooth,  $\cdot 6$  to  $\cdot 7$  in. long,  $\cdot 5$  to  $\cdot 6$  in. broad; pyrenes two, compressed at top, enlarged below, beaked, longitudinally furrowed and rugose, woody. *Seed* flattened; testa membranous; albumen thin; embryo flattened; cotyledons ovate,  $\cdot 1$  in. long; radicle thick, as long as cotyledons. Hook. Bot. Misc. II. 73; Blume Bijdr. 1034; A. DC. Prodr. VIII. 337; Hassk. Fl. Bot. Zeit. (1845) 263; Spanoghe in Linnæa, XV. 325; Koord. & Val. Bijdr. I. 93. *Cyrtosiphonia sumatrana*, Miq. Fl. Ind. Bat. II. 401.

PERAK: *Scortechini* 132, 1737; *King's Collector* 4755, 5700.—

DISTRIB. Sumatra (*Teysmann* 993, 995; *Forbes* 2851, 2860), Java (*Forbes* 1051).

Jack says that the wood is very light, and is used by the Sumatrans for the scabbards of swords and kris.

## 7. HUNTERIA, Roxb.

Glabrous trees. *Leaves* opposite, coriaceous, shining, with many slender nerves. *Flowers* in short close axillary or subterminal cymes. *Calyx* small, 5-lobed, eglandular. *Corolla* salver-shaped; the tube cylindric, somewhat dilated near the mouth, throat annulate; lobes much overlapping to the left. *Stamens* inserted in the dilated portion of the tube; anthers oblong-lanceolate, cells rounded at the base; filaments short. *Disk* none. *Carpels* 2, distinct; style filiform, thickened at top; stigma bifid; ovules 2 to 4 in each carpel. *Fruit* of two stalked berries, distinct or connate at base, ovoid or subfusiform, oblique or recurved, 1-seeded or 2-celled by the intruded placenta, not pulpy. *Seeds* ovoid or oblong; testa membranous; albumen smooth, fleshy; cotyledons ovate, leafy; radicle straight.—DISTRIB. Three species—one of India, Ceylon, and Malay Peninsula, another of Java, and a third of tropical Africa.

HUNTERIA CORYMBOSA, Roxb. Fl. Ind. I. 695, and ed. Carey and Wall. II. 531 (1824). A tree, reaching 30 to 40 feet in height and 15 to 20 in. in diameter; branchlets slender, slightly angled and striate, and dull brown when dry. *Leaves* oblong or oblong-lanceolate, obtusely abruptly caudate-acuminate at apex, acute at base; glabrous on both surfaces; 3 to 7 in. long, 1 to 2 in. broad; midrib slender, impressed above, prominent beneath; main nerves numerous, about 22 to 26 pairs, slender, slightly curved upwards to meet in an intramarginal nerve close to the edge; secondary nerves similar to main-nerves, recurrent-branched; reticulations prominent, all more or less raised on both surfaces when dry; petiole .25 to .5 in. long, slender. *Cymes* on short peduncles about .5 to .75 in. long; branches corymbose, short; pedicels slender, angled, .1 to .2 in. long; bracts minute; flower-buds slender, .5 to .6 in. long; flowers waxy-white. *Calyx*-lobes ovate-acute, .05 to .1 in. long, glabrous. *Corolla*-tube cylindrical, .3 to .35 in. long, slightly dilated above and annulate at the throat, minutely pubescent within; lobes ovate-oblong, .2 to .25 in. long. *Stamens* with short filaments; anthers .05 in. long. *Carpels* conical, glabrous. *Berries* globose, obtusely beaked, smooth, yellow, 2-seeded, .75 in. in diameter, on a .25 in. long flattened stalk. *Seeds* ovoid, flattened on one side, convex on the other, .5 in. long, .4 in. broad; testa very thin; albumen thick, fleshy; cotyledons ovate, .125 in. long, 3-nerved; radicle stout, cylindric, as long as the cotyledons. Wall. Cat. 1608; Wight Ic. t. 428; A. DC. Prodr. VIII. 350; Miq. Fl. Ind. Bat. II. 409; Hook. f. Fl. Br. Ind. III. 637; Trimen Fl. Ceyl. III. 128. *H. zeylanica*, Gardn.; Thw. Enum. 191; Bedd. Fl. Sylv. t. 265. *H. ? lanceolata*, Wall. Cat. 161; A. DC. l. c. *H. Roxburghiana*, Wight Ic. t. 1294; Thw. Enum. 192; Bedd. l. c. CLVIII. *Cameraria zeylanica*, Retz. Obs. IV. 24; A. DC. l. c. 389. *Gynopogon lanceolatum*, Kurz For. Fl. II. 177. *Tabernaemontana salicifolia*, Wall. Cat. 1580. *T. parviflora*, Herb. Heyne.

KEDAH; on Lankawi Island, Curtis 237. PENANG: Wallich 1608; King's Collector 1460, 1468; Phillips. PERAK: Wray 3378; King's Collector 7465. SELANGOR: Ridley 8556.—DISTRIB. India, Ceylon, Burma, Sumatra (Forbes 2716, 2722, 2737).

#### Subtribe 2.—CERBERINÆ.

##### 8. CERBERA, Linn.

Small glabrous trees or large shrubs. *Leaves* alternate or scattered, long, with slender parallel nerves. *Flowers* large, white or red, in pseudo-terminal cymes. *Calyx* 5-lobed, eglandular, the segments long; tube almost none. *Corolla* large; tube funnel-shaped above,

cylindric below; lobes 5, spreading, overlapping to the left. *Stamens* included, small; anthers lanceolate, apiculate, rounded at base. *Disk* none. *Carpels* 2, distinct; style filiform; stigma large, disciform, with a bilobed apiculus; ovules 4 in each carpel, on both sides of a thick placenta. *Fruit* of 1, rarely 2, globose or ellipsoid drupes; pericarp very thick, fibrous and woody. *Seeds* broad, compressed, peltately attached to the enlarged placenta; albumen none; cotyledons thin; radicle very short.—*DISTRIB.* Species 4, found in Madagascar, tropical Asia and the Pacific Islands.

CERBERA ODOLLAM, Gaertn. Fruct. II. 193, t. 124 (1791). A small tree or large shrub, with very thick branches and stout branchlets prominently marked by the scars of fallen leaves. *Leaves* leathery; variable in shape and somewhat in venation; oblanceolate or oblong-obovate, acute or abruptly short acuminate at apex, attenuate at base; black when dry, glabrous on both surfaces, shining above; 3 to 8 in. long, 1 to 2 in. broad; midrib slender; main nerves numerous but variable in number (15 to 25), starting nearly at right angles to the midrib, straight and meeting in an intramarginal looped nerve; secondary nerves many, between the main nerves, reticulations indistinct; petiole .75 to 1.5 in. long, stout. *Cymes* large; main peduncles stout, 3 to 5 in. long; branches corymbosely paniculate; bracts ovate, deciduous, leafy, .5 to 1 in. long; pedicels .75 to 1 in. long, stout; flowers white with a red or yellowthroat. *Calyx* glabrous, lobes linear-oblong, acuminate, .5 to 1 in. long. *Corolla*-tube .5 to .75 in. long, cylindric below, funnel-shaped above, pubescent and ribbed within and furnished with 5 projecting ribs at the mouth; lobes broadly elliptic, oblique, acute, about as long as the tube. *Drupe* ovoid, 2 to 4 in. long, smooth, green; 2 to 4 in. in diameter; pericarp very thick, fleshy without, fibrous within. *Seeds* broad, compressed; cotyledons fleshy, ovoid, flattened. A. DC. Prodr. VIII. 353; Wight Ic. t. 441; Roxb. Fl. Ind. I. 692, and ed. Carey & Wall. II. 527; Miq. Fl. Ind. Bat. II. 413; Brandis For. Fl. 322; Kurz For. Fl. II. 171; Bedd. Fl. Sylv. CLVII.; Hook. f. Fl. Br. Ind. III. 628; Trimen Fl. Ceyl. III. 128; Cooke Fl. Bomb. II. 128; Prain Beng. Plants 670; Koord. & Val. Bijdr. I. 84. *C. Manghas*, Linn. Sp. Pl. 208, partly; Wall. Cat. 1582 and Roxb. Fl. Ind. ed. Carey & Wall. II. 529; Hook. Bot. Mag. t. 1845; K. Schum. in Engl. & Prantl Nat. Pflanzenfam. IV. 2, 159, fig. 57, P to S. *C. lactaria*, Ham.; A. DC. l. c.; Miq. l. c. 414. *C. laurifolia*, Lodd. Bot. Cab. t. 989. *Tanghinia Odollam, lactaria*, and *laurifolia*, G. Don Gen. Syst. IV. 98. "*Odollam*," Rheede Hort. Mal. I. t. 39.

PENANG: Wallich 1582; Curtis 1651, 1713. PERAK: *Scortechini* 964; Wray 2508; Ridley 7178; King's Collector 1131. MALACCA: Griffith; Hervey. SINGAPORE: Ridley 8083; Hullett 807, 871. —

DISTRIB. India, Ceylon, Burma, Malay Archipelago, China, Australia, Pacific Islands.

A plant of sea-coasts and tidal creeks. Hullett says the Malay name is "*Betak-betak*," and that the milky juice is poisonous. Linnæus's name, *C. Manghas*, ought to take precedence of Gaertner's, but it was applied to two species, the former of which belonged to a different genus, so we follow the Fl. Br. Ind. and other authorities in retaining Gaertner's name.

#### 9. OCHROSIA, Juss.

Trees. *Leaves* whorled, rarely opposite or scattered; nerves very numerous, parallel, spreading. *Cymes* pedunculate at the ends of the branches, alternate with the uppermost leaves, finally lateral. *Calyx* 5-lobed, eglandular. *Corolla* salver-shaped; tube cylindric, not or very slightly dilated opposite the stamens, throat naked; lobes 5, twisted, overlapping to the right. *Stamens* included in the tube of the corolla, at or above the middle; anthers lanceolate, rounded at the base. *Disk* very small, annulate, or none. *Carpels* 2, distinct or connate at the base; style filiform; stigma oblong, 2-fid; ovules in each carpel 2 to 6, biseriate, on either side of a prominent placenta. *Fruit* of 2 spreading drupes, sometimes connate at the base; epicarp thinly fleshy; endocarp thick, hard, often dorsally compressed and more or less grooved ventrally. *Seeds* solitary or 2 separated by the placenta, flattened; testa membranous; albumen absent or fleshy; cotyledons large, flat, foliaceous; radicle short, superior.—DISTRIB. About 12 species, found from the Mascarene Islands eastwards through the Malay Archipelago to Australia and the Pacific.

OCHROSIA BORBONICA, Gmel. Syst. Veg. I. 439 (1796). A small evergreen glabrous tree, reaching 20 feet in height; branches very stout, fleshy; branchlets fleshy, glaucous green, marked with the prominent scars of fallen leaves. *Leaves* fleshy when green, membranous when dry, in whorls of 3 to 4 or irregularly placed; obovate, obtuse and very briefly apiculate at apex, cuneately narrowed at base; upper surface shining, lower pale; 4 to 10 in. long, 2 to 5 in. broad; midrib stout, raised on both sides; main nerves many, 20 to 26 pairs, slender, parallel, leaving the midrib at an angle of about 80° and slightly curving to meet in an intramarginal nerve close to the edge; secondary nerves 1 to 2 between each pair of main nerves branching and joining the irregular reticulations; petiole .5 to 1.5 in. long, thick. *Cymes* in short, thick, corymbose branches; primary peduncles stout, 1 to 4 in. long; secondary peduncles about 1 in. long; branches and pedicels short, thick; lower bracts somewhat leafy, upper deciduous; bracteoles 2, triangular, on the pedicels below the calyx; flowers white; buds elongate. *Calyx*-lobes



coriaceous, ovate; tube about equal to lobes, *Corolla*-tube cylindric, about .15 in. long, glabrous within; lobes spreading, oblong, as long as tube or rather longer. *Drupe*s 2 to 2.5 in. long, 1.75 in. broad, slightly recurved, yellow, obliquely ovoid. *Seeds* large, flat. A. DC. Prodr. VIII. 356; Wall. Cat. 1584; Bedd. Fl. Sylv. CLVIII.; Hook. f. Fl. Br. Ind. III. 638; Trimen Fl. Ceyl. III. 129, t. 60. *O. salubris*, Blume Mus. Bot. I. 158; Kurz For. Fl. II. 172. *Cerbera salutaris*, Lour. Fl. Cochinch. I. 163; Blume Bijdr. 1033. *C. parviflora* Wall. Cat. 1584. *C. oppositifolia* Lam. Enc. I. 62; A. DC. l.c. 354. *C. platysperma*, Gaertn. Fruct. II. 193. *Lactaria salubris*, Rumph. Herb. Amb. II. 255, t. 84; Miq. Fl. Ind. Bat. II. 415. *Calpicarpum Lamareckii*, G. Don Gen. Syst. IV. 100.

SINGAPORE: Wallich 1584.—DISTRIB. Andaman Islands, Ceylon, Mascarene Islands, Malay Archipelago.

A plant of the tidal creeks, "more decidedly maritime than *Cerbera Odollam*" (Trimen). The milky juice is thick and viscid. The leaves as shown in Trimen's plate are not at all characteristic.

#### 10. KOPSIA, Blume.

Glabrous trees or shrubs. *Leaves* opposite, membranous or subcoriaceous, penniveined. *Flowers* white or pink, in short terminal cymes; the rachis often bearing imbricated bracts. *Calyx* small, 5-partite, eglandular within. *Corolla* salver-shaped; tube very slender, only slightly dilated opposite the stamens, without scales at the mouth, pilose within; lobes twisted, overlapping to the right. *Stamens* near the top of the tube; anthers acute, cells rounded at the base. *Disk* of 2 glands alternating with the carpels. *Carpels* 2, distinct; style filiform; stigma thickened, with a short apiculus; ovules 2 in each carpel, 1 on either side of a thick placenta. *Fruit* of 2 obovoid or obliquely quadrate drupes or capsules, furrowed on the anterior face; pericarp subcoriaceous, 1-seeded, or 2-celled by the intruded placenta and two-seeded. *Seeds* oblong; testa membranous; albumen none; cotyledons usually thick.—DISTRIB. About 12 species of the Malay Peninsula and Archipelago.

Tube of corolla dilated at the top:—

Branches of the inflorescence with rather distant bracts:—

Leaves usually more than 5 in. long and 2 in. broad:—

Cymes much-branched, many-flowered; lobes of corolla

broad .. .. 1. *K. fruticosa* var. *albiflora*.

Cymes little-branched, few-flowered; lobes of corolla

narrow .. .. 2. *K. pauciflora*.

Leaves usually under 5 in. long and 2 in. broad:—

- Carpels glabrous; corolla-tube under 1 in. long; calyx-lobes acuminate .. .. 3. *K. Scortechinii*.  
 Carpels hairy; corolla-tube over 1 in. long; calyx-lobes rounded .. .. 4. *K. Griffithii*.  
 Branches of the inflorescence covered with many closely imbricating bracts; bracts very small; cyme-branches very short; corolla-tube under .4 in. long .. .. 5. *K. larutensis*.  
 Tube of corolla dilated in the middle; branches of the inflorescence with imbricating bracts:—  
 Cymes under .5 in. long; leaves lanceolate, under 4.5 in. long .. .. 6. *K. Ridleyana*.  
 Cymes 1 to 3 in. long; leaves elliptic-oblong or oblong-obovate, 5 to 9 in. long .. .. 7. *K. macrophylla*.

1. *KOPSIA FRUTICOSA*, A. DC. Prodr. VIII. 352 (1844). A large evergreen shrub; branchlets smooth, pale brown. *Leaves* thinly coriaceous, opposite; elliptic, elliptic-oblong; or elliptic-lanceolate, obtusely caudate-acuminate at apex, acuminate attenuate at base; glabrous on both surfaces, shining above, pale beneath; 4 to 9 in. long, 1.5 to 3.5 in. broad; midrib thick; main nerves prominent beneath, 10 to 14 pairs, more or less parallel, gradually curving upwards to meet in a faintly looped intramarginal nerve close to the edge; secondary nerves short; reticulation distinct; petiole short, .25 in. long, ending in a gland at the apex. *Cymes* short, in a dense many-bracted subtrichotomous corymb at the ends of pseudo-terminal peduncles; peduncle short, stout; secondary peduncles also short, as are the tertiary and the pedicels; all minutely fulvous-pubescent, as are the bracts; bracts many, ovate, acute or obtuse, .1 to .15 in. long, pubescent, ciliate on the edges, leaving when they fall prominent scars; bracteoles similar, 2 on each pedicel under the calyx. *Calyx*-tube short; lobes 5, minutely pubescent, ovate-oblong, obtuse or emarginate and with a gland at the apex, ciliate on the margins, .15 to .2 in. long. *Corolla*-tube slender, slightly dilated at the summit opposite the stamens, 1.5 in. long; mouth red, minutely pubescent; lobes elliptic obovate, obtuse, half as long as the tube or slightly more, pink. *Anthers* oblong-lanceolate, acute. *Disk*-glands beaked. *Carpels* 2, oblong, obtuse; style slender; stigma calyptriform, 2-lobed at top. *Fruit* of 2 (more usually 1) urn-shaped flattened capsules, more or less triangular in shape, 1 to 1.25 in. long, villous, veined, opening by a slit on the ventral margin. *Seeds* oblong-lanceolate, .8 in. long, .25 in. broad, 3-ribbed; testa membranous; albumen none; cotyledons oblong-lanceolate, .75 in. long, .25 in. broad, fleshy; radicle very small. Bot. Mag. 4220; Hook. f. Fl. Br. Ind. III. 639; Prain Beng. Plants, 671. *Calpicarpum Roxburghii*, G. Don Gen. Syst. IV. 100; Wight Ic. t. 431; Kurz For. Fl. II. 178; Miq. Fl. Ind. Bat. II. 412. *Cerbera fruticosa*,

Ker Bot. Reg. t. 391; Roxb. Fl. Ind. I. 691, and ed. Carey & Wall. II. 526; Wall. Cat. 1583.

SINGAPORE: cultivated, *Maingay* (K.D.) 1055.—DISTRIB. Burma. This shrub is very commonly cultivated in Indian and Malayan gardens.

VAR. *albiflora*, King & Gamble. Differs but little from the species, but has white flowers, a glabrous acutely pointed capsule, more oblong leaves, and rather larger corolla-lobes. *Calpicarpum albiflorum*, Teysm. & Binn. in Tijds. Ned. Ind. XXV. (1863) 402. See also Ridley in Trans. Linn. Soc. Ser. 2, III. 320.

SINGAPORE: *Goodenough* 59; *King's Collector* 1232; *Ridley*.—DISTRIB. Java, Ceram (*Teysmann* 5035).

2. *KOPSIA PAUCIFLORA*, Hook. f. Fl. Br. Ind. III. 639 (1882). A shrub (?); branchlets slender, pale brown, uppermost angled. *Leaves* chartaceous; elliptic or elliptic-lanceolate, obtusely caudate-acuminate at apex, acuminate at base; olivaceous-green and somewhat shining on the upper, yellowish and dull on the lower, surface; 4 to 6 in. long, 1·5 to 2·5 in. broad; midrib fairly prominent, impressed on the upper, much raised on the lower, surface; main nerves 6 to 10 pairs, distant, starting at an angle of 60° with the midrib and curving upwards to join in an obscure intramarginal nerve quite close to the edge; secondary nerves and transverse reticulations prominent on the lower surface; petiole ·25 in. long, stout. *Cymes* terminal, few-flowered; the rachis ·25 to ·5 in. long, with many ovate-acute persistent bracts. *Calyx* ·15 in. long; lobes ovate, obtuse, rather shorter than the tube. *Corolla*-tube very slender, cylindric, 1·5 to 2 in. long, villous inside, dilated at the top; lobes linear-oblong, 1 in. long, at length reflexed in flower. *Anthems* small, near the top of the tube. *Fruit* not known.

MALACCA: on Mount Ophir, *Maingay* (K.D.) 1056.

3. *KOPSIA SCORTECHINII*, King & Gamble, n. sp. A tree, reaching 40 to 50 feet in height; the branchlets swollen at the nodes. *Leaves* chartaceous; elliptic oblong, briefly acuminate at apex, unequally narrowed at base; somewhat shining on the upper, pale on the lower surface; margins slightly recurved; 2 to 5 in. long, 1 to 2 in. broad; midrib slender, impressed above, ending in a gland at the apex; main nerves 8 to 16 pairs, at an angle of about 70° with the midrib, curving upwards to join in an intramarginal nerve immediately close to the edge; reticulations inconspicuous; petiole ·1 in. long, glandular at the base inside. *Cymes* terminal, pseudo-terminal or lateral, on peduncles of varying (·25 to 2 in.) length; branches spreading, corymbose; bracts ovate-triangular, acute, ·1 to ·15 in. long, glabrous; pedicels short variable, each with a pair of small bracteoles; flowers large, white; buds clavate. *Calyx*-tube scarcely any; lobes ovate

acuminate, with a gland at the point behind, ciliate on the margins, .1 in. long. *Corolla*-tube slender, dilated at the top then constricted, .75 to 1 in. long, pubescent within below the stamens and half-way down; lobes spreading, linear-oblong, .5 to .75 in. long. *Anthers* lanceolate-acuminate, .1 in. long; filaments short. *Disk*-scales longer than carpels, broadened below, beaked above. *Carpels* glabrous; style very slender; stigma short, cylindric. *Fruit* not seen.

PERAK: *Scortechini* 1878.

4. *KOPSIA GRIFFITHII*, King & Gamble, n. sp. A small tree (?); branchlets pale brown, slender, enlarged at the nodes. *Leaves* coriaceous; ovate to ovate-oblong, abruptly obtusely caudate-acuminate at the apex, which is often emarginate, attenuate at the base; shining above, pale beneath; 3.5 to 5 in. long, 1.5 to 2 in. broad; midrib slender, prominent and channelled above; main nerves many (22 to 30 pairs), close, parallel, starting at an angle of about 70° with the midrib, and slightly curving to meet in an intramarginal nerve close to the edge, raised and prominent on the upper, less so in the lower surface; reticulations few; petiole .25 in. long, bordered by the decurrent margins of the blade, those of each pair of leaves embracing the branchlet so as nearly to meet. *Cymes* axillary and pseudo-terminal, sessile or on very short peduncles, corymbose; primary branches few and irregular in length and number of flowers (sometimes 1 flower only); bracts ovate-acute, very small, glabrous; pedicels slender, .4 to .6 in. long, with 2 to 3 minute bracteoles near the middle; flowers apparently large, white; buds long, clavate. *Calyx*-tube almost none; lobes nearly orbicular, .05 in. long, ciliate on the margins, a gland on the back near the top. *Corolla*-tube very slender, 1 to 1.5 in. long, inflated at the top, slightly pubescent within below the stamens; lobes ovate, ovate-oblong or oblong, obtuse, .75 to 1 in. long. *Anthers* lanceolate-acuminate, .15 in. long; filaments short. *Disk*-glands subulate, slender. *Carpels* obtuse, densely long-hairy; style slender; stigma oblong, bifid. *Fruit* not seen.

MALACCA: *Griffith*.

VAR. *paucinervia*, King & Gamble. A shrub, 4 to 6 feet high, flower very white. Similar to the species, but the leaves with fewer, 12 to 15 main nerves leaving the midrib at an angle of about 50° only, and not so abruptly or caudately acuminate. The carpels show the same shaggy hairs, and the disk-glands are the same.

PERAK: *King's Collector* 10707, in dense jungle, on limestone hills, at 500 to 800 feet.

5. *KOPSIA LARUTENSIS*, King & Gamble, n. sp. A shrub reaching 10 feet in height, or a small tree up to 25 feet; branches pale brown,



rather smaller than a goose-quill, corky-barked and somewhat scurfy when dry. *Leaves* coriaceous; oblong-lanceolate, obtusely long caudate-acuminate at apex, cuneate at base; margins recurved; upper surface shining, lower pale, both reddish when dry; 4 to 10 in. long, 1.5 to 2.5 in. broad; midrib stout, ending in a gland at the extreme apex; main nerves parallel, 15 to 22 pairs, impressed on the upper, raised on the lower surface, starting at an angle of about  $70^\circ$  to the midrib and gently curving upwards to meet in a looped intramarginal nerve close to the edge; secondary nerves and reticulations few; petiole very short or almost none, at most .2 in. long, stout, those of each pair of leaves joined by a slight ridge at the nodes. *Cymes* axillary or pseudo-terminal, sessile, few- (up to 10-) branched, very short at first but lengthening gradually to .5 in.; the branches covered with very small ovate-triangular densely imbricate bracts; flowers small, cream-coloured; buds clavate. *Calyx*-tube short; lobes ovate, obtuse, with a gland on the back near the top, ciliate on the margins. *Corolla*-tube cylindrical, slender, .3 to .4 in. long, slightly dilated at the top opposite the stamens, pubescent within; lobes spreading, much twisted, .3 in. long, oblong-spathulate. *Anthers* lanceolate, apiculate, the bases rounded; filaments very short. *Disk*-glands subulate. *Carpels* 2, glabrous. *Fruit* of 2 (often only 1) urn-shaped capsules, triangular in shape, inflated on the dorsal, grooved on the ventral margin where they dehisce, .7 in. long on the ventral margin, .6 in. broad, .25 in. thick, striate, beak sharp. *Seeds* 1, ovoid, .4 in. long; testa membranous; albumen none; cotyledons fleshy, thick; radicle very small.

PERAK: in low-lying woods near Larut, Wray 2736, 3956; *Scortechini* 57, 59, 1704; *King's Collector* 462, 2082, 4269, 6165.

6. *KOPSIA RIDLEYANA*, King & Gamble, n. sp. A low shrub, reaching a foot or so in height; branchlets smooth, the size of a crow-quill. *Leaves* chartaceous when dry; lanceolate, obtusely acuminate at apex, cuneately attenuate at base; shining above, pale below; 4 to 4.5 in. long, 1 to 1.5 in. broad; midrib slender, ending in a gland at the apex; main nerves 12 to 14 pairs at an angle of about  $60^\circ$  with the midrib, curving upwards to meet in a slender looped intramarginal nerve, raised above as are the few secondary nerves and oblique reticulations; petiole .15 in. long, somewhat stem-clasping and slightly fimbriate-scaly at the base. *Cyme* terminal or apparently so, sessile, branches very few (2 to 3), about .3 to .5 in. long, furnished with many ovate-acute broadly sheathing glabrous bracts; flowers on very short pedicels, pure white; buds clavate. *Calyx*-tube very short; lobes ovate, obtuse or almost emarginate, with a gland on the back, glabrous, .1 to .15 in. long.

*Corolla* very slender, 1 in. long, dilated in the middle, pubescent at the mouth, glabrous within; lobes spreading, oblong-obovate, .75 in. long, .25 in. broad. *Anthers* lanceolate, acute, rounded at base, .1 in. long; filaments very short. *Disk-glands* subulate. *Carpels* 2, 2-celled, each cell 2-seeded; style very slender; stigma cylindrical, bilobed. *Fruit* not known.

NEGRI SEMBILAN: at Perhutan Tinggi, *Ridley* 10093.

7. *KOPSIA MACROPHYLLA*, Hook. f. Fl. Br. Ind. III. 639 (1882). A shrub, 6 to 10 feet high; branchlets dark brown, the size of a goose-quill, smooth. *Leaves* thinly coriaceous when fresh, chartaceous when dry; elliptic-oblong or oblong-obovate, obtusely short caudate-acuminate at apex, cuneate at base; margins only slightly or not recurved; upper surface light green with yellow towards the centre when fresh and with a metallic lustre when dry, lower surface pale brown, very minutely pubescent especially on the nerves; 5 to 9 in. long, 2 to 2.5 in. broad; midrib stout, ending in a gland at the apex; main nerves 18 to 22 pairs, raised on both surfaces, sometimes branched, at first straight and parallel, starting at an angle of about 55° with the midrib, then slightly curving to join in an intramarginal nerve close to the edge; secondary nerves few and reticulations prominent above when dry; petiole none or at most .1 in. long, those of each pair of leaves joined by a slight ridge at the node. *Cymes* pseudo-terminal, with a short (.5 to .7 in.) stout peduncle and few, usually 2, thick branches, 1 to 3 in. long, densely covered with small broadly ovate pubescent imbricate ciliate bracts, .1 to .15 in. long; the branches not again branched; pedicels very short, stout; bracteoles 2, obtuse, ciliate, pubescent, under the calyx; flowers very white; buds clavate. *Calyx*-tube very short; lobes 5, imbricate, oblong, obtuse or emarginate, with a gland on the back, minutely pubescent and ciliate, .1 in. long. *Corolla*-tube very slender, 1 in. long, dilated in the middle, glabrous within except for a slight ring below the anthers; lobes obovate, .5 to .75 in. long, .4 to .5 in. broad, rounded. *Anthers* lanceolate, .1 in. long; filaments very short, slightly pilose at base. *Carpels* rounded, minutely pubescent at apex; style slender. *Fruit* not seen, said to be pale green in colour.

PERAK: in rich soil on low ground, *King's Collector* 4963. SINGAPORE: *Lobb*.

Haviland's No. 3042 from Borneo comes very near this, but the tube of the corolla is dilated near the top; the bracteate branches of the inflorescence are longer; and the leaves have a dark upper surface, more irregular main-nerves and the marginal nerve farther from the edge, and with another more slender outside it. But the material is insufficient for description.

Subtribe 3.—EUPLUMERINÆ.

11. ALSTONIA, Br.

Trees or erect shrubs; branches often in whorls. *Leaves* usually whorled, rarely opposite, frequently with numerous nearly horizontal nerves; stipules sometimes represented by glands or a ridge between the leaf-petioles. *Inflorescences* of terminal or pseudo-terminal corymbose or umbelliform cymes, sometimes verticillate on the rachises. *Calyx*-tube short, sometimes urceolate, sometimes almost none; lobes 5, short, eglandular. *Corolla* hypocrateriform; tube cylindric, dilated opposite the stamens, usually at the top, the throat naked, annulate or with reflexed hairs; lobes overlapping either to the right or left. *Stamens* usually at the top of the tube, sometimes lower, included; anthers free, usually lanceolate; filaments short, filiform. *Disk* none, or annular or lobed; the lobes 2 alternate with the carpels. *Carpels* 2, distinct; style filiform; stigma oblong or cylindric, usually bifid at apex; ovules in each cell many, pluriseriate. *Fruit* of 2 follicular mericarps, usually long, cylindric, slender. *Seeds* oblong, compressed, peltate on flattened tough placentas, ciliate and usually with tufts of long hairs at the ends; testa membranous, often papillose; albumen fleshy, rather scanty; cotyledons oblong, flat; radicle about as long as the cotyledons, superior.—DISTRIB. Species about 30; found in India, Malaya, tropical Australia and Polynesia, one in tropical Africa.

Leaves with close parallel nerves, apex usually obtuse; corolla-lobes overlapping to the left; follicles over 6 in. long, equally broad throughout; seeds rounded at both ends (Subgenus I. *PALA*):—

Ovary villous; corolla-tube pubescent without; leaves 3 to 7 in. long .. .. . 1. *A. scholaris*.

Ovary glabrous; corolla-tube glabrous without:—

Corolla-tube rather broad; follicles glabrous; leaves 2 to 4 in. long .. .. . 2. *A. spathulata*.

Corolla-tube slender; follicles pubescent; leaves 2·5 to 5 in. long .. .. . 3. *A. angustiloba*.

Leaves with close parallel nerves, apex usually acute; corolla-lobes overlapping to the left; follicles under 6 in. long, broadest in the middle; seeds oblong, dentate at the ends (Subgenus II. *BLABEROPUS*) .. .. . 4. *A. Curtisii*.

Leaves with distant more or less parallel nerves; corolla-lobes overlapping to the right; follicles long, slender, equally broad throughout; seeds acute or acuminate at one end, rounded at the other (Subgenus III. *DISSURASPERMUM*):—

Stamens inserted at the top of the corolla-tube, which is

glabrous without; leaves 5 to 12 in. long; main nerves 20 to 24 pairs; seeds rounded at one end, bifid and acute at the other .. .. . 5. *A. macrophylla*.

Stamens inserted near the middle of the corolla-tube, which is pubescent without; leaves usually 4 to 6 in. long; main nerves 12 to 16 pairs; seeds rounded at one end, long-acuminate at the other .. .. . 6. *A. angustifolia*.

#### IMPERFECTLY KNOWN.

##### 7. *A. GRANDIFOLIA*.

##### 8. *A. PANGKORENSIS*.

1. *ALSTONIA SCHOLARIS*, Br. in Mem. Wern. Soc. Edinb. I. 76 (1811). A large evergreen tree, reaching 60 feet or more in height and 6 feet or more in girth; stem buttressed; branches verticillate; branchlets smooth, swollen at the nodes; juice milky, bitter as is also the wood; glabrous except the inflorescence. *Leaves* coriaceous, verticillate, 4 to 7 in a whorl; oblong-obovate, oblong or elliptic-oblong, obtuse or sometimes shortly and bluntly acute, occasionally emarginate at apex, cuneate at base; bright green and shining above, white or grey glaucous beneath, 3 to 7 in. long, 1·5 to 2·5 in. broad; midrib thick; main nerves parallel, 30 to 40 pairs, at first almost at right angles to the midrib, slightly curving upwards to an intramarginal nerve close to the edge; secondary nerves many, similar but more slender; reticulations few; petiole stout, ·25 to ·75 in. long, with a hooked process on the upper side near the base. *Inflorescence* pseudo-terminal. *Cymes* umbellately branched; main peduncles stout, 3 to 5, variable in length, usually 2 to 3 in.; secondary peduncles slender, 5 to 7, supported often by a spatulate leafy bract; pedicels short; terminal flowers subcapitate; bracteoles oblong or ovate; flowers greenish-white; buds obovoid; whole inflorescence more or less tawny pubescent. *Calyx*-tube very short; lobes ovate, obtuse, ciliate, sometimes unequal in size. *Corolla*-tube cylindric, slightly enlarged below, much dilated at the top, hairy on both sides, ·25 to ·35 in. long, annulate within at the mouth; lobes ovate, obtuse, ·15 in. long, cordate at base, rounded at top. *Disk* none. *Anthers* lanceolate, acute, rounded below; pollen-grains spherical, with small prominences. *Ovary* densely pale-villous; style slender; stigma cylindric, bifid at apex. *Fruit* of 2 follicles, 1 to 2 feet long and ·10 to ·15 in. broad, pendulous, terete. *Seeds* oblong, peltate, on a narrow placenta, flattened, ·3 in. long, ·075 in. broad, scabrous-papillose on both surfaces, reddish-brown, furnished at each end with tufts of slender tawny hairs up to ·5 in. long; albumen very thin; cotyledons oblong, about ·1 in. long; radicle slender, as long as cotyledons. A. DC. Prodr. VIII. 408; Wall. Cat. 1644; Wight Ic. t. 422; Hook. f. Fl.



Br. Ind. III. 642; Miq. Fl. Ind. Bat. II. 436; Blume Bijdr. 1037; Brandis For. Fl. 325; Bedd. Fl. Sylv. t. 242; Kurz For. Fl. II. 183; Koord. & Val. Bijdr. I. 117; Trimen Fl. Ceyl. III. 133; Engl. & Prantl IV. i. 138, t. 53; Cooke Fl. Bomb. II. 132; Prain Beng. Plants, 672. *Echites scholaris*, Linn. Mant. 55. *E. Pala*, Ham. ex Spreng. Syst. I. 633; A. DC. l. c. 477. — “Pala,” Rheede Hort. Mal. I. t. 45.

PENANG: Wallich 1644A. PERAK: Wray 170 (Vern. “Poko Palai”); Scortechini 601; King’s Collector 7952. MALACCA: Hervey. SINGAPORE: Wallich 1644B. — DISTRIB. Throughout India, Ceylon and Burma, the Malay Archipelago, tropical Australia and Africa.

2. *ALSTONIA SPATHULATA*, Blume Bijdr. 1037 (1834). A tree reaching 30 to 40 feet in height and 12 to 15 in. diam, (*Scortechini* and others), 60 to 100 feet in height and 3 to 4 feet in diameter (*King’s Collector* 5263); glabrous; branches verticillate; branchlets smooth, swollen at the nodes. *Leaves* coriaceous; verticillate, 3 to 5 in a whorl; obovate or spathulate; rounded at the apex, or sometimes slightly obcordate; cuneate at base; bright green and shining above, whitish beneath, when dry both surfaces brown; margins recurved; 2 to 4 in. long, 1 to 2 in. broad; midrib stout, impressed above; main nerves raised above, 20 to 30 pairs, the lower ones horizontal, the upper gradually more and more curving upwards to meet in an intramarginal nerve close to the edge; secondary nerves few, similar; reticulations indistinct; petiole very short, bordered by the decurrent margin of the blade. *Inflorescence* pseudo-terminal. *Cymes* small, umbellately arranged in whorls; peduncle 1 to 2 in. long, stout, usually 1 only, sometimes 2 to 3; whorls of flowers 2 to 3, about .5 in. or less apart; pedicels slender, .25 to .5 in. long; bracts and bracteoles small, ovate-acute, caducous; flowers a “frosty” or “waxy” white; buds clavate. *Calyx*-tube .05 in. long; lobes as long, orbicular, margins ciliate. *Corolla*-tube slender below, dilated above, .25 in. long, pubescent within, annulate at the throat; lobes oblong, twisted, .2 in. long, white villous within at the base. *Anthers* lanceolate, small; filaments very short; pollen-grains spherical with opposite round prominences. *Disk* none or very short. *Ovary* glabrous; carpels separate below, joined above; style slender, .15 in. long; stigma cylindric, bifid. *Fruit* of two follicles, 5 to 7, occasionally to 9, in. long, .1 to .15 in. broad, erect, terete, sometimes minutely pubescent. *Seeds* oblong, peltate, flattened, .25 in. long, .1 in. broad, ciliate and margined all round, nearly smooth on the faces, furnished at each end with tufts of slender tawny hairs up to .75 in. long; albumen scanty; cotyledons oblong, about .1 in. long; radicle as long as cotyledons, slender. A. DC. Prodr.

VIII. 410; Miq. Fl. Ind. Bat. II. 437; Hook. f. Fl. Br. Ind. III. 642; Koord. & Val. Bijdr. I. 121. *A. cuneata*, Wall. Cat. 1645

PERAK: in low marshy places and on river banks, *Scortechini* 1716; *Wray* 170 bis; *King's Collector* 400, 4009, 6852, 7464, 7780. MALACCA: *Griffith*; *Maingay* (K.D.) 1068; *Derry* 1064; *Cantley* 1937.—DISTRIB. Java, Borneo (*Haviland*, 1689, 3044).

Wallich's No. 1645 bears on the label, "e Sirmur," which is clearly a wrong habitat as mentioned by Hooker.

3. *ALSTONIA ANGUSTILOBA*, Miq. Fl. Ind. Bat. II. 438 (1856). A large tree reaching 60 to 100 feet in height and 3 to 4 feet in diameter; branches spreading, verticillate; branchlets dark brown, as thick as a goose-quill, terete. *Leaves* coriaceous, verticillate, 4 to 7 in a whorl, oblong or elliptic-oblong, shortly and obtusely acute at apex, attenuate at base; shining light green above, glaucous grey beneath; margins recurved; 2·5 to 5 in. long, 1 to 1·5 in. broad; midrib prominent; main nerves very many, 30 to 40, the lower ones parallel, at right angles to the midrib, the upper curved upwards, all meeting in the slightly thickened nerve-like margin, raised above; secondary nerves few, similar; reticulations very indistinct; petiole ·5 to ·75 in. long, channelled above, bordered by the decurrent margins of the blade. *Inflorescence* terminal, grey-pubescent, umbellate; peduncles stout, 1 to 5 together (usually 1 only), followed by a whorl of about 4 to 6 secondary branches, ·25 to ·5 in. long, bearing capitate clusters of many flowers on very short pedicels, and in addition 3 to 5 longer branches surmounted by similar capitate clusters or again whorled; bracts and bracteoles very small, ovate-acute, caducous; flowers dark red without, pale yellow within (K.C. No. 5270); buds narrow, linear, clavate, glabrous. *Calyx*-tube short; lobes ovate-acute, grey-pubescent, ciliate, together ·06 in. long. *Corolla*-tube cylindrical, slightly dilated above, annulate at the mouth, glabrous without, pubescent within, ·25 in. long; lobes narrow, linear-oblong, ·15 to ·2 in. long, with a small tuft of villous hairs at the base within. *Disk* none. *Anthers* lanceolate-acute; pollen-grains spherical, with 2 small spherical prominences opposite each other on different sides. *Ovary* glabrous; carpels distinct; style slender; stigma cylindrical, bifid at apex. *Fruit* of two grey-pubescent follicles, 6 to 8 in. long and barely ·1 in. in diameter, erect, terete. *Seeds* flat, rectangular-oblong, ·2 in. long, ·05 in. broad, bordered, not papillose, furnished at each end with a tuft of long tawny hairs up to ·5 in. long; albumen scanty; cotyledons oblong, narrow; radicle as long as cotyledons. Koord. & Val. Bijdr. I. 120.

PENANG: *Curtis* 3087. PERAK: *Wray* 4058; *King's Collector* 5263,

5270. MALACCA: *Griffith*. SINGAPORE: *Cantley* 166; *Ridley* 8095 (var. *glabra*, Koord. & Val.).—DISTRIB. Java (*Koorders* 1β, 14230), Borneo (*Haviland* 1732). Wray gives the vernacular name "*Jelutong*," Curtis "*Getah Paule*," Cantley "*Gutta Pulei*."

A leaf-specimen collected by G. King "halfway up Penang hill," in August, 1879, and another from Malacca, collected by Hervey in 1835, have "*Leaves* in whorls of 4 to 6, oblong-lanceolate, shortly and bluntly acuminate at apex, attenuate at base; green above, glaucous grey beneath; 4 to 6 in. long, 1 to 1·5 in. broad; main nerves very many, nearly 40, very regular and parallel; petiole rather slender, ·25 to ·6 in. long." They agree well with *Teysmann's* No. 994 from Loeboe Aloeng, Sumatra, *Alstonia calophylla*, Miq. Fl. Ind. Bat. II. 439.

4. *ALSTONIA CURTISII*, King & Gamble, n. sp. A dwarf compact shrub; branchlets slender, grey, ringed by the ridges marking fallen leaves. *Leaves* membranous when dry, in whorls of 3 to 4; oblanceolate, sharply acuminate at apex, attenuate at base; dull on both surfaces, pale beneath; margins recurved; 3 to 4 in. long, ·75 to 1 in. broad; midrib slender; main nerves parallel, starting at about 70° to the midrib and curved upwards to the margin, 24 to 27 pairs, indistinct; secondary nerves similar, between the main nerves; reticulations very indistinct; petiole none or very short, bordered by the decurrent margins of the blade, with 2 to 3 small subulate glands on the upper surface at the base. *Cymes* pseudo-terminal, 1 to 2, few-flowered; peduncles short, ·1 to ·2 in. long; pedicels slender, ·75 in. long; flowers white; buds long clavate with a swelling in the middle. *Calyx*-tube short; lobes as long as tube, ·05 in., ovate-acuminate, hyaline at the margins, glabrous. *Corolla*-tube very slender, 1 in. long, dilated a little above the middle, glabrous without, slightly pubescent within below the stamens; lobes oblong-falcate, overlapping to the left in bud, ·6 in. long, spreading, glabrous. *Stamens* inserted within the dilatation; anthers lanceolate, ·15 in. long; filaments short; pollen globose. *Disk* of two subulate scales on broad bases alternate with the carpels. *Ovary* glabrous; style very slender; stigma cylindric, elongated (·05 in.), bifid at apex; ovules very many. *Fruit* of two glabrous follicles, 3 to 3·5 in. long, ·1 to ·15 in. broad, acuminate at apex. *Seeds* oblong, peltate on a tough placenta, ·25 in. long, ·1 in. broad; margins scabrous, dentate, especially at the ends; testa covered with brown papillæ on the outer and with two ridges on the inner side; coma white, silky, very short at the sides, up to ·15 in. long at the ends; albumen scanty.

KASOOM: limestone islands, *Curtis* 3242.

5. *ALSTONIA MACROPHYLLA*, Wall. Cat. 1648 (1829). A large tree, reaching 40 to 60 feet in height and 1 to 2 feet in diameter; branches stout, fleshy; branchlets more or less quadrangular and channelled on



the sides, marked with prominent leaf-scars. *Leaves* chartaceous; ternately verticillate, oblong-lanceolate or elliptic-lanceolate; shortly and abruptly acuminate at apex, cuneately attenuate at base for nearly half their length; light green above, pale and glabrous or sparsely brown-pubescent, especially along the nerves beneath; margins slightly recurved; 5 to 12 in. long, 1.5 to 3 in. broad; midrib slender; main nerves 20 to 24 pairs, parallel, starting at about 65° with the midrib and curving upward to meet in a very faint looped intramarginal nerve close to the edge, raised beneath; secondary nerves none; reticulations transverse, indistinct; petiole stout, .5 to 1 in. long, when young slender, base enlarged. *Inflorescence* pseudo-terminal, sessile; peduncles about 6 to 10, slender, 1 to 2 in. long, simple or occasionally branched, bearing spreading, many-flowered, 2- to 3-chotomous cymes; bracts none; bracteoles minute, ovate-acute; pedicels slender; cyme-branches pedicels and calyx minutely grey-pubescent; flowers yellowish-white; buds cylindric-clavate. *Calyx*-tube short, .03 in. long; lobes 5, ovate-acute, pubescent without, glabrous within except at the tips. *Corolla*-tube cylindrical below, slightly dilated above, glabrous without, sparsely pubescent within below the stamens, mouth contracted, .15 in. long; lobes oblong, rounded, folded in bud and overlapping to the right, as long as the tube, ciliate on the edges and villous at the base within. *Stamens* inserted at the top of the corolla-tube; anthers lanceolate, apiculate, rounded below; filaments short; pollen spherical. *Disk* annular, .025 in. deep. *Ovary* glabrous, ovoid, acute; carpels 2; ovules very many; style slender; stigma cylindric, bifid. *Fruit* of two pendulous follicles reaching 18 in. in length, about .1 to .2 in. in thickness, terete. *Seeds* peltate, on narrow, ribbon-like placentas, oblong, rounded below, slightly bifid and acute above, bordered by tawny hairs which are short at the sides and long plumose, up to .3 in., at the ends; testa very thin, papillose; albumen rather thick; cotyledons oblong, small; radicle as long as cotyledons. A. DC. Prodr. VIII. 409; Hook. f. Fl. Br. Ind. III. 643; Miq. Fl. Ind. Bat. II. 438. *A. costata*, Wall. Cat. 1649, not of Br.

PENANG: Wallich 1648, 1649; Maingay (K.D.) 1066/2, 1070/2; Curtis 378; King's Collector 1637, 1732, 1733. — **DISTRIB.** Borneo, Philippines, New Guinea.

6. *ALSTONIA ANGUSTIFOLIA*, Wall. Cat. 1650 (1829). A tall tree; branchlets dark brown, somewhat quadrangular and channelled, stout. *Leaves* nearly coriaceous, ternately whorled or opposite; obovate or oblanceolate, obtusely abruptly acuminate at apex, long cuneately attenuate at base for about half their length; glabrous and green above, pale and glabrous or when young pubescent beneath; margins slightly



recurved, 4 to 6 in. long, 1 to 1.75 in. broad; midrib slender, channelled above; main nerves 12 to 16 pairs, at an angle of from 60° to 70° to the midrib, curving upwards to meet in a very faint intramarginal looped nerve; secondary nerves few; reticulations many, transverse; petiole .5 to 1 in. long. *Inflorescence* pseudo-terminal, sessile, grey-pubescent; peduncles 2 to 6, variable in length, usually from 1 to 2 in. long, ending in branched 2- to 3-chotomous corymbose spreading cymes; bracts none; bracteoles minute, triangular; pedicels slender, short but variable; flowers small, grey-pubescent, white (?), buds shortly clavate. *Calyx*-tube urceolate, glabrous within, .05 to .1 in. long; lobes ovate, reflexed, pubescent on both surfaces, .005 in. long. *Corolla*-tube cylindric, slightly dilated a little above the middle, pubescent on both surfaces, .125 in. long; lobes spreading, .075 in. long, rounded, nearly glabrous within when open, except for the tuft of hairs above the base. *Stamens* inserted a little above the middle of the tube; anthers ovate, apiculate, .035 in. long; filaments very short. *Disk* annulate, wavy at margin, very short. *Ovary* glabrous, ovoid-acute; style slender; stigma conical, penicillate below, bifid above. *Fruit* of two erect (?) foliicles, reaching 18 in. in length and .15 in. in diameter, stiff, ribbed when dry. *Seeds* peltate, on narrow, ribbon-like, tough placentas, oblong, rounded below, long acuminate above, .4 in. long, .1 in. broad, bordered by tawny hairs which are short and reflexed at the sides and plumose at the ends, reaching .3 in. in length; testa thin, minutely papillose on the inner, villous on the outer surface; albumen flattened; cotyledons oblong, as long as the straight radicle. A. DC. Prodr. VIII. 409; Hook. f. Fl. Br. Ind. III. 643.

PENANG: *Griffith*; *Maingay* (K.D.), 1066, 1067, 1070. MALACCA: *Derry* 1080. JOHORE: *Ridley* 10942. SINGAPORE: *Wallich* 1650; *Kurz*; *T. Anderson* 140; *Ridley* 2716, 5571.

VAR. *elliptica*, King & Gamble. *Leaves* opposite or in whorls of three, elliptic, acute at apex and at base, glabrous except on the lower surface when quite young; 3 to 4 in. long, 1.25 to 1.75 in. broad; main nerves regular, raised beneath; petiole .75 to 1 in. long with a callus on the inner surface near the base; branchlets rough, dark brown.

PENANG: *Curtis*. Scarcely a variety, but the shape of the leaves is very distinct.

VAR. *latifolia*, King & Gamble. *Leaves* larger, obovate, 5 to 7 in. long, 2.5 to 3 in. broad, glabrous. *Flowers* rather larger; calyx-lobes shallower. A small tree with spreading branches, reaching 15 to 20 feet in height and 3 to 4 in. in diameter.

PENANG: *Maingay* (K.D.) 1070/1, 1070/2; *Curtis* 2491; *Fox* 80; *Ridley* 9306; *Stoliczka*; *King's Collector* 1341.

This species comes very near to *A. villosa*, Blume, of the Malay Archipelago, but we hesitate to join them, as there are important characters of difference, *e. g.*, the very villous inside of the corolla-tube in *A. villosa*.

#### SPECIES IMPERFECTLY KNOWN.

7. *ALSTONIA GRANDIFOLIA*, Miq. Fl. Ind. Bat. Suppl. 555 (1862). A lofty tree; the branchlets very stout, sharply angled, transversely rugose. *Leaves* chartaceous, in whorls of 4 to 6, those of each whorl usually more or less unequal; elliptic-oblong or obovate, acute at apex, gradually narrowed from the middle downwards at the base; brown and glabrous and somewhat shining on the upper, glaucous on the lower, surface; margin undulate; 7 to 13·5 in. long, 2·5 to 5 in. broad; midrib very stout, flat on the upper, much raised on the lower, surface; main nerves 20 to 30 pairs, very regular, parallel, at an angle of from 60° to 70° with the midrib, straight to the margin to meet a nerve which forms the margin itself, all raised beneath; secondary nerves very few, chiefly near the apex; reticulations transverse, forming an elegant network on the lower surface; petiole 1 to 1·25 in. long, stout. *Follicles* elongate, woody (Miq.). Rest unknown.

SINGAPORE: *T. Anderson* 119.—DISTRIB. Sumatra (*Teysmann*).

*A. eximia*, Miq., *l. c.*, seems to differ only in the main nerves being more nearly at right angles (80°) with the midrib. It also comes from Sumatra.

8. *ALSTONIA PANGKORENSIS*, King & Gamble, n. sp. A large tree (?); branches very stout, smooth, somewhat fleshy, grey. *Leaves* membranous; obovate or oblanceolate, abruptly and shortly and bluntly acuminate at apex, cuneate at the base for the lower two-thirds; glabrous above, minutely pubescent beneath, especially on the nerves; margins recurved; 12 to 14 in. long, 4 in. broad; midrib very stout, impressed above, strongly raised beneath; main nerves about 18 pairs, stout, parallel, raised beneath, usually about ·75 in. apart along the midrib, starting at an angle of about 75° and gently curving upwards to the margin; secondary nerves few; reticulations bold, fairly prominent on the lower surface; petiole stout, about ·75 in. long. *Follicles* very slender, 10 to 12 in. long, glabrous, striate, the margins reflexed after the fall of the seeds. Rest unknown.

DINDINGS: Pangkor Island, *Scortechini* 1024.

#### 12. *DYERA*, Hook. f.

Glabrous trees with verticillate branches and thick angular channelled branchlets, laticiferous. *Leaves* in whorls, large, coriaceous, oblong or obovate, with prominent main nerves and long petioles;

stipular ridges between the petioles. *Inflorescence* of pseudo-terminal and axillary umbellately branched cymes; flowers small. *Calyx* 5-lobed, very small, eglandular; tube very short, adnate to the base of the ovary. *Corolla* hypocrateriform, 5-lobed; tube short, hardly dilated opposite the stamens; the throat naked; lobes 5, folded in bud and overlapping to the left. *Stamens* 5, in the middle of the tube, included; filaments very short; anthers oblong-ovoid; cells small; the connective produced in a thickened terminal fleshy appendage. *Disk* annular, obscure. *Ovary* 2-celled, short, entire, conic, obtuse at the top, which is pubescent; style none or minute; stigma obpyriform, minutely bifid at apex; ovules many in each cell on intruded placentæ. *Fruit* of two cylindric follicular mericarps of very large size, connate at the base, at first divergent, afterwards curling back and opening flat. *Seeds* elliptic, large, flat, peltate, surrounded by a broad membranous striate wing, longer at the ends than in the middle; testa very thin, glandular-papillose; albumen flat, rather scanty; cotyledons elliptic, very thin; radicle small, superior.—*DISTRIB.* Three species, of the Malay Peninsula and Archipelago.

Leaves usually under 6 in. long, main nerves starting nearly at right angles to midrib; corolla-tube nearly as long as lobes; cymes with rather short peduncles .. .. 1. *D. costulata*.  
 Leaves under 8 in. long, main nerves starting at about 60° with the midrib; corolla-tube very much shorter than lobes; cymes with long peduncles .. .. 2. *D. laxiflora*.

1. *DYERA COSTULATA*, Hook. f. in Journ. Linn. Soc. XIX. 293 (1882). A very large tree, reaching 100 to 150 feet in height and 3 to 4 feet in diam.; branches verticillate with reddish thick bark; branchlets thick, angular and channelled, at any rate when dry. *Leaves* coriaceous, in whorls of 6 to 8; broadly elliptic or elliptic-oblong, rounded and sometimes very shortly and abruptly acute at apex, rounded at base or sometimes attenuate; upper surface bright green shining, lower pale bluish-green glaucous, especially when young; margins somewhat undulate, slightly recurved; 3 to 7 in. long, 1·5 to 3 in. broad; midrib stout, very prominent beneath, impressed and keeled above; main nerves 16 to 20 pairs, at first nearly at right angles to the midrib, then curving upwards to join in a looped nerve at the margin, raised on both surfaces when dry, as are the prominent reticulations; petiole 1 to 1·25 in. long, ribbed, furnished with a rounded cone-like gland on the upper surface at the base, the glands of the uppermost whorl of leaves conniving in a cone over the bud. *Cymes* pseudo-terminal, or from the penultimate leaf-whorl; peduncles of varying length, 1 to 3 in. long, rather slender branches umbellately whorled; secondary peduncles ·25 to ·5 in. long;

pedicels slender, short; bracteoles triangular, minute; flowers yellowish; buds linear-oblong. *Calyx*-tube adnate to the base of the ovary; lobes ovate rounded, glabrous, .6 in. long. *Corolla*-tube short, .1 in. long, glabrous, except a ring of scanty reflexed hairs within near the base below the insertion of the filament; narrow raised folds between the stamens; lobes oblong, cordate at base, folded in bud, rounded at top, .15 in. long. *Stamens* inserted a little above the base of the corolla-tube; pollen globose with small pits. *Follicles* very large, on greatly thickened peduncles (.5 in. in diam.), 9 to 15 in. long, 1 to 1.5 in. broad, after splitting open nearly 3 in. broad, connate at the base, at first straight, but after dehiscence curved backwards so as nearly to touch at the points. *Seeds* peltate, flat, elliptic, surrounded by a membranous striate wing, broader at the ends than in the middle, 2.5 in. long, 1 in. broad, the seed part 1.25 by .75 in.; testa thin, granular-papillose; albumen thin; cotyledons ovate, .7 by .4 in., very thin and difficult to separate; radicle short. Fl. Br. Ind. III. 644. *Alstonia* ? *costulata*, Miq. Fl. Ind. Bat. Suppl. 556.

PENANG: *Curtis* 339I; *Scortechini* 1973; *King's Collector* 4689, 8181, 8784. MALACCA: *Griffith*; *Maingay* (K.D.) 1097; *Derry* 554. PAHANG: in Tahan Woods, *Ridley* in Trans. Linn. Soc. 2nd Ser. III. 320. SINGAPORE: *Ridley* 4922. — **DISTRIB.** Sumatra (*Teysmann*, *Diepenhorst* 1114).

This is the chief plant that gives the "*Gutta Jehutong*," which seems, however, to be used only as an adulterant of the true *Guttas* given by species of *Palaquium* and *Payena*. *Beccari*, in 'Nelle foreste di Borneo,' 561, says that the *Gutta* of the allied Bornean species *Dyera Lowii*, Hook. f., is absolutely wanting in elasticity, and quickly resinifies and becomes pulverulent.

2. *DYERA LAXIFLORA*, Hook. f. Fl. Br. Ind. III. 644 (1882). A very large tree, reaching 100 to 150 feet in height and 3 to 4 feet in diam.; branches verticillate; branchlets angular, furrowed, rugose, very thick, dark brown. *Leaves* chartaceous, in whorls of 4 to 7; elliptic-obovate or obovate, rounded or shortly acute at apex, rounded at base or especially when young cuneate-attenuate; upper surface bright green glossy, lower glaucous; margins slightly recurved; 6 to 8 in. long, 2 to 3.5 in. broad; midrib prominent, depressed and keeled above, much raised beneath; main nerves 13 to 17 pairs, starting at an angle of about 60° with the midrib, and only very slightly curving upwards to meet in a looped nerve at the margin, slightly impressed above, raised beneath; reticulations many, prominent on both surfaces; petiole 1 to 2 in. long, channelled, furnished at the base with a prominent gland, which, especially those of the uppermost whorl, is recurved, hooked,



and forms a cone over the bud. *Cymes* from the penultimate whorl of the branchlets; peduncles 2 to 5 in. long, slender; branches umbellately whorled; secondary peduncles slender, .75 to 1 in. long; pedicels very slender, about .2 to .3 in. long; bracts leafy, orbicular, petioled, caducous; bracteoles very small, triangular; flowers white; buds linear-oblong. *Calyx*-tube adnate to the lower part of the ovary; lobes orbicular, rounded or sometimes emarginate, glabrous, .05 in. long. *Corolla* salver-shaped; tube urceolate, ribbed without, .075 in. long, glabrous, except a ring of reflexed hairs below the insertion of the filaments; lobes oblong, rather narrow in bud, broad in flower, reaching .2 in. in length and .1 in. in breadth. *Ovary* pubescent on top; stigma sessile, bilobed. *Fruit* not known.

PERAK: *Wray* 541; *King's Collector* 7852 (or 4?). SINGAPORE: *Murton*; *Burbidge*; *Cantley* 226; *Ridley*; *Hullett* 343. Vern. name, "Kayu (wood) Jelutong" (*Wray*).

### 13. HOLARRHENA, Br.

Trees or shrubs. *Leaves* opposite, usually membranous, glabrous or pubescent, penninerved. *Flowers* white, in terminal or axillary or sub-axillary corymbose cymes. *Calyx* 5-fid or 5-partite; lobes narrow, usually glandular at the base on one or both sides. *Corolla* hypocrateriform; tube slender, cylindric, slightly dilated opposite the stamens; the throat contracted, naked; lobes 5, oblong, overlapping to the right. *Stamens* included in the tube near the base; anthers lanceolate mucronate; cells rounded at the base; filaments short, slender. *Disk* none. *Ovary* of 2 distinct carpels; style shortly filiform; stigma below the anthers oblong-fusiform, tip entire or bifid; ovules many in each carpel. *Fruit* of 2 elongate, terete, follicular mericarps. *Seeds* oblong or linear, concave inside, the funicle in the concavity; tipped with a deciduous coma of slender hairs; albumen scanty; cotyledons broad, complicate; radicle short.—DISTRIB. Species 8; 5 in tropical Africa, 3 in India and Malaya.

Leaves over 4 in. long and 2 in. broad, membranous, main nerves irregular; follicles 10 to 15 in. long; cymes broad 1. *H. antidysenterica*.  
Leaves under 4 in. long and 2 in. broad, chartaceous, main nerves regular; follicles 6 in. long; cymes narrow .. 2. *H. Curtisii*.

1. *HOLARRHENA ANTIDYSENTERICA*, Wall. Cat. 1672 (1828). A small tree, glabrous or pubescent; the branchlets slender, lenticellate. *Leaves* membranous, variable; ovate or ovate-oblong to elliptic, obtusely acuminate at apex, rounded or attenuate or cuneate often unequally at base; glabrous above, glabrous or more or less pubescent beneath;

4 to 8 in. long, 2 to 4 in. broad; midrib slender in the glabrous-leaved, broad in the pubescent-leaved forms; main nerves 10 to 14 pairs, irregular, at about  $50^{\circ}$  with the midrib, curved upwards to and along the margin where they anastomose; secondary nerves few or none; reticulations irregular, not prominent; petiole .1 to .2 in. long, sometimes none. *Cymes* many-flowered, dichotomous, 3 to 6 in. in diameter, sessile or shortly peduncled; pedicels slender, .25 to .5 in. long; bracts small, lanceolate, pubescent or glabrous, ciliate; buds clavate; flowers white. *Calyx*-lobes linear-lanceolate, .1 to .2 in. long, ciliate, glandular at base or not; tube scarcely any. *Corolla*-tube slender, .3 to .4 in. long, puberulous, slightly inflated at base; mouth contracted; lobes oblong, acute or rounded at top, infolded in bud, ciliate, .4 in. long. *Anthers* mucronate. *Ovary* glabrous; style short; stigma fusiform. *Follicles* 10 to 15 in. long, .2 in. broad, terete, black, often dotted with white spots, diverging below, then incurved. *Seeds* linear-oblong, channelled on the inner, rounded on the outer, face, .5 to .6 in. long, flattened at the hilum; coma golden-brown, .75 to 1 in. long; cotyledons cordate at base, .4 in. long; radicle .1 in. A. DC. Prodr. VIII. 413; Brandis For. Fl. 326, t. 40; Bedd. Fl. Sylv. CLX. tab. xx. 6; Kurz For. Fl. II. 182; Hook. f. Fl. Br. Ind. III. 644; Cooke Fl. Bomb. II. 133; Prain Beng. Pl. 674. *H. Codaga*, G. Don Gen. Syst. IV. 78; A. DC. *l. c.* 414; Kurz *l. c.* 181; Wight Ic. 1297. *H. malaccensis*, Wight Ic. 1298; Miq. Fl. Ind. Bat. II. 441. *H. pubescens*, Wall. Cat. 1673; A. DC. *l. c.* 413; Miq. *l. c.* 440. *Echites antidysenterica*, Roxb. *Chonemorpha* (?) *antidysenterica*, G. Don *l. c.*; Wight Ic. 439. "*Codaga-Pala*," Rheede Hort. Mal. I. t. 47.

MALACCA: *Capt. Wight* cf. Wight Ic. 1298.—DISTRIB. India and Burma.

There are available in the Herbaria of Kew and Calcutta sheets of only one specimen, which is that collected by Capt. Wight, and which was figured in the 'Icones' as *H. malaccensis*. It is a specimen of the glabrous form of the tree, as was to be expected, that being the more usual form in the damp regions of India, as is the pubescent one in the dry regions.

2. *HOLAREHENA CURTISII*, King & Gamble, n. sp. A shrub, reaching 8 feet in height; branchlets slender, dark brown, smooth; innovations pubescent. *Leaves* chartaceous; oblong or oblong-lanceolate or obovate, acute or rounded at apex, attenuate and rounded at base; shining above, pale beneath and minutely pubescent; the margins recurved; 1.5 to 3.5 in. long, .75 to 1 in. broad; midrib thick, prominent beneath; main nerves 12 to 14 pairs, regular, at about  $45^{\circ}$  with the midrib, curving upwards to and along the margin, raised beneath; secondary

nerves occasional; reticulations minute; petiole .1 to .15 in. long, bordered by the decurrent margins of the blade. *Cymes* axillary, corymbose, pubescent, 1.5 to 2.5 in. in diameter, on peduncles .5 to .75 in. long; bracts linear-oblong or spathulate; bracteoles linear, .15 in. long, on the pedicels below the flower; pedicels slender; flowers white; buds clavate. *Calyx*-lobes linear-oblong, .25 in. long, rounded or acute at top, ciliate, pubescent, with 2 glands at the base within; tube almost none. *Corolla*-tube slender, slightly inflated near the base opposite the stamens, contracted at the mouth, .4 in. long, ciliate on the edges, pubescent on both surfaces; lobes oblong, rounded at top, narrowed at the base, the margins infolded in bud, pubescent on both sides. *Anthers* .05 in. long, mucronate. *Ovary* of 2 distinct glabrous carpels; style very short; stigma fusiform, bifid, below the anthers. *Follicles* brown, straight, terete, 6 in. long, .2 in. broad, only little divergent. *Seeds* oblong, keeled on one side, concave on the other, .4 in. long; coma golden-brown, up to 1.5 in. long.

SIAMESE STATES: Trang, at 100 to 200 feet, *Kunstler* 1402; *Curtis* 3392. — *DISTRIB.* N. Siam (*F. H. Smiles*), Cambodia (*Godefroy-Lebœuf* 189).

#### 14. ERVATAMIA, Stapf.

Shrubs or small trees, usually glabrous; branchlets usually dichotomous. *Leaves* opposite, herbaceous to coriaceous, usually membranous when dry; axillary stipules usually distinct; axillary glands small, often numerous. *Flowers* small to middle-sized, sometimes showy, in terminal, pseudo-terminal or axillary cymes, usually corymbose and often in pairs; branches dichotomous. *Calyx* small; lobes 5, free or connate at the base, glandular or not within. *Corolla* salver-shaped; tube cylindric, slightly dilated at the mouth or rarely lower, opposite the stamens; lobes overlapping to the left, rarely to the right. *Stamens* erect, included; filaments short, usually decurrent in ridges inside the tube; anthers linear, bilobed at base, acute or mucronate, dehiscing throughout their length. *Disk* 0. *Ovary* of 2 carpels, distinct or slightly cohering; style long, filiform; stigma clavate, with a slender bifid apiculus; ovules numerous, pluriseriate. *Fruit* of two follicular mericarps, obliquely ovoid to lanceolate or cylindric-lanceolate, often curved and beaked, sometimes 1- to 3-keeled; dehiscing along the ventral suture and at length often opening out flat. *Seeds* few to many, enveloped in a bright-coloured aril, more or less irregularly ellipsoid, grooved or hollowed ventrally; testa crustaceous, finely sulcate, the furrows protruded into the copious often waxy albumen; cotyledons flat, cordate; radicle cylindric.—*DISTRIB.* Species about

30 to 35 in tropical Asia, Australia, and Polynesia; 1 species in Madagascar.

Leaves with main nerves curving upwards; stamens near the top of the corolla-tube :—

Leaves chartaceous or coriaceous; branchlets stout; calyx-lobes thick, broad, short :—

- |   |    |    |                          |
|---|----|----|--------------------------|
| Cymes glabrous or very slightly pubescent | .. | .. | 1. <i>E. corymbosa</i> . |
| Cymes hirsute                             | .. | .. | 2. <i>E. hirta</i> .     |

Leaves membranous; branchlets slender :—

Calyx-lobes very small, under .1 in. long :—

- |  |    |    |                          |
|--|----|----|--------------------------|
| Calyx-lobes ovate, acute; follicles oblong, keeled, beak slightly recurved; seeds 3 to 6 | .. | .. | 3. <i>E. coronaria</i> . |
|--|----|----|--------------------------|

- |   |    |    |                             |
|---|----|----|-----------------------------|
| Calyx-lobes ovate, rounded; follicles twisted, beak much recurved; seeds 1 to 2 | .. | .. | 4. <i>E. peduncularis</i> . |
|---|----|----|-----------------------------|

Calyx-lobes lanceolate, over .1 in. long :—

- |   |    |    |                              |
|---|----|----|------------------------------|
| Calyx-lobes over .3 in. long; follicles 1.5 to 3 in. long, narrowly cylindric, not keeled | .. | .. | 5. <i>E. cylindrocarpa</i> . |
|---|----|----|------------------------------|

- |  |    |    |                            |
|--|----|----|----------------------------|
| Calyx-lobes .15 to .2 in. long; follicles .75 to 1.25 in. long, oblong falcate, 3-keeled | .. | .. | 6. <i>E. malaccensis</i> . |
|--|----|----|----------------------------|

- |  |    |    |                         |
|--|----|----|-------------------------|
| Calyx-lobes .1 to .15 in. long; follicles 1 to 1.5 in. long, ovoid, long-acuminate, not keeled | .. | .. | 7. <i>E. Curtisii</i> . |
|--|----|----|-------------------------|

Leaves with main nerves at right angles to midrib and straight or very slightly curving; branchlets stout; stamens near the middle of the corolla-tube .. .. .

- |                          |
|--------------------------|
| 8. <i>E. polyneura</i> . |
|--------------------------|

1. *ERVATAMIA CORYMBOSA*, King & Gamble. A shrub or small tree, reaching 30 to 40 feet in height and 8 to 10 in. in diameter; branchlets stout, smooth, uppermost internodes somewhat flattened. *Leaves* chartaceous; elliptic-oblong or elliptic-lanceolate, obtusely acuminate at apex, cuneately narrowed at base; dark green above, pale beneath; margins sometimes slightly recurved; those of each pair often very unequal in size; 6 to 16 in. long, 2 to 6 in. broad; midrib stout, raised beneath; main nerves 12 to 16 pairs, leaving the midrib at an angle of 65° to 75° and at first nearly straight, then curving upwards to and along the margin, usually impressed above and strongly raised beneath; reticulations few, inconspicuous; petiole stout, .5 to .8 in. long, base enlarged half-stem-clasping; axillary glands prominent, meeting at the nodes. *Cymes* many-flowered, much-branched, usually in pairs in the axils of the second uppermost pair of leaves, di-tri-chotomous; peduncles variable, .5 to 2.5 in. long, stout; secondary peduncles similar, 1 to 1.5 in. long; pedicels slender, .5 to 1 in. long, somewhat clavate; bracts obsolete; flowers spreading, corymbose, waxy cream-colour; buds clavate, the top large, globose, often minutely grey-pubescent. *Calyx*-tube campanulate, .5 in. long, thick; lobes ovate, rounded, ciliate, .1 in. long; glands, if present, two at the base of the lobes inside. *Corolla*-



tube cylindric, slender, slightly dilated at top, opposite the stamens, .75 in. long; lobes oblong-falcate, .5 in. long or rather more; pubescent without, crispate on one edge and auricled on that edge at the base. *Anthers* linear-oblong, blunt or mucronate, .125 in. long, the basal lobes adherent to the connective; filaments short, decurrent in lines inside the corolla-tube. *Ovary* of 2 ovoid, glabrous carpels; style filiform; stigma clavate, tip entire or bifid. *Follicles* thick, globular-ovoid, recurved, very shortly beaked, obtusely keeled, rough outside, 1.5 in. long, 1 in. in diameter; ventral suture impressed. *Seeds* very many, oblong-obtuse, deeply hollowed ventrally, .5 in. long, .2 to .25 in. broad and deep; testa crustaceous, glandular-papillose, with deep ridges within, which extend into the copious albumen; cotyledons cordate, .15 in. long; radicle cylindric, .25 in. long. *Tabernæmontana corymbosa*, Roxb. Fl. Ind. II. 25; A. DC. Prodr. VIII. 376; Wall. Cat. 1772 and Bot. Reg. under t. 1273; Hook. f. Fl. Br. Ind. III. 646; Miq. Fl. Ind. Bat. II. 420.

PENANG: *Wallich* 1572; *Phillips*; *Curtis* 1763. PROVINCE WELLESLEY: *Ridley* 7032. PERAK: *Wray* 4169; *King's Collector* 3141, 3522, 5792, 5999, 7163, 7376. MALACCA: *Griffith*. JOHORE: at Jaffaria, *G. King*. SINGAPORE: *T. Anderson* 82, 117; *Murton* 115; *Ridley* 4119, 8416, 8431.

VAR. *Kelsalli*, King & Gamble. *Leaves* thinner than in the type, oblong-lanceolate; main nerves fewer (10 pairs) and at a more oblique angle (50°). *Cymes* nearly sessile, much fewer-flowered.

SELANGOR: at Bukit Etam, *Kelsall* 1992.

VAR. *pubescens*, King & Gamble. *Inflorescence* covered with slight greyish-yellow pubescence.

PERAK: *King's Collector* 4830. MALACCA: *Goodenough* 1638.

This is scarcely a variety. In many of the specimens of the species the corolla in bud is thickly tomentose outside, and thus we have a gradation from the glabrous to the pubescent form.

2. *ERVATAMIA HIRTA*, King & Gamble. A large shrub (?); branchlets stout, somewhat flattened, dark brown, lenticellate. *Leaves* coriaceous; elliptic-ovate or -oblong, long acuminate at apex, acute at base; dull on both surfaces, dark olivaceous-brown on the upper, much paler on the lower; margins recurved; 4 to 12 in. long, 2.5 to 5 in. broad; midrib rather slender, flattened on the upper, raised on the lower surface; main nerves 10 to 15 pairs, starting at about 70° with the midrib and curving upwards to anastomose near the margin, impressed above, raised beneath; secondary nerves apparently none; reticulations obscure; petiole .25 to .5 in. long, stout. *Cymes* almost hirsute, many-flowered, much branched, usually in pairs in the axils of

the second uppermost pair of leaves, 2- to 3-chotomous; peduncles flattened, curved, 1.25 to 1.75 in. long; secondary peduncles similar but rather shorter; pedicels slender, about .5 in. long; bracts and bracteoles obsolete; buds clavate, reaching .75 in. long, nearly glabrous, the top globose. *Calyx* sometimes 7-lobed, cup-shaped, eglandular, hispid without, glabrous within; tube .15 in. long; lobes ovate-acute, as long as tube. *Corolla*-tube cylindric, .5 in. long, slightly inflated opposite the stamens near the top, glabrous; lobes oblong-falcate, crispate on one edge and auricled on that edge near the base, much twisted to the right, .25 in. long (in bud). *Anthers* lanceolate, with a hooked mucro at tip, .075 to .1 in. long, the basal lobes adherent to the connective; filaments short. *Ovary* of 2 ovoid glabrous carpels; style filiform; stigma clavate, with a slender, usually bifid tip. *Follicles* ovoid, falcate, recurved, obscurely keeled and obtusely beaked, 1 to 1.5 in. long by .5 to .75 in. broad, smooth outside, ventral suture impressed before dehiscence. *Seeds* many, crescent-shaped, deeply hollowed ventrally, .5 in. long, .25 in. broad and deep; testa crustaceous, ribbed, and with deep ridges which extend into the albumen; cotyledons ovate, .05 in. long; radicle slender, .1 in. long. *Tabernaemontana hirta*, Hook. f. Fl. Br. Ind. III. 646.

MALACCA: *Griffith*; *Maingay* (K.D.) 1059; *Derry* 77.

This species comes near to *E. corymbosa* var. *pubescens*, but the hirsute inflorescence at once distinguishes it.

3. *ERVATAMIA CORONARIA*, Stapf in Dyer Fl. Trop. Afr. iv. 127 (1902). A shrub; branches many, dichotomous, corky, pale brown. *Leaves* membranous; lanceolate or oblanceolate or oblong-lanceolate, long-acuminate at apex, acuminate at base, the pairs often unequal-sized; deep green on the upper, paler on the lower surface; 3 to 6 in. long, .75 to 1.5 in. broad; midrib slender; main nerves 7 to 9 pairs, distant, curving upwards to and along the margin; secondary nerves and reticulations indistinct; petiole .3 to .4 in. long, slender, the base half-stem-clasping; axillary glands present. *Cymes* few- (2- to 10-) flowered; peduncles 1.5 in. long; pedicels slender, about .25 in. long; bracteoles minute, usually 2 to each pedicel, one below the calyx, one lower down; flowers white, fragrant; buds clavate. *Calyx*-tube short; lobes ovate, acute or rounded, ciliate, biglandular within. *Corolla*-tube slender, .7 to .9 in. long, scarcely dilated slightly below the middle opposite the stamens, pubescent within below the stamens; mouth with flattened glands; lobes as long as the tube, ovate-oblong, obtuse, one edge slightly crispate. *Anthers* lanceolate, .05 in. long, minutely hooked at tip; filaments hairy. *Ovary* of 2 glabrous carpels; style short; stigma cylindric, bifid

at tip. *Follicles* spreading at about  $90^{\circ}$  to  $100^{\circ}$  apart, oblong, 1 to 2 in. long, with 1 to 3 keels and a recurved acuminate tip, opening out flat when fully ripe. *Seeds* 3 to 6, irregularly oblong, angular, .25 in. long, enclosed in a red pulpy aril; deeply grooved ventrally with a branching groove; testa crustaceous, sulcate, glandular, the furrows protruded into the albumen, which is copious; cotyledons ovate-cordate, .1 in. long; radicle cylindric, as long as the cotyledons. COOKE Fl. Bomb. II, 134. *Tabernaemontana coronaria*, Willd. Enum. Hort. Berol. 275; Ait. Hort. Kew. ed. 2, II. 72; A. DC. Prodr. VIII. 373; Roxb. Fl. Ind. II. 23; Wall. Cat. 1568; Wight Ic. 477; Lodd. Bot. Cab. t. 406; Lindl. in Bot. Reg. t. 1064; Dalz. & Gibs. Bomb. Fl. 144; Miq. Fl. Ind. Bat. II. 421; Brandis For. Fl. 322; Bedd. Fl. Sylv. CLIX.; Hook. f. Fl. Br. Ind. III. 646; Trimen Fl. Ceyl. III. 133; Prain Beng. Plants 673. *T. divaricata*, Blume Bijdr. 1626; Kurz. For. Fl. II. 174. *Nerium divaricatum*, Linn. Sp. Pl. 306. *N. coronarium*, Jacq. Coll. I. 138, t. 52; Bot. Mag. t. 1861. *Jasminum zeylanicum*, Burm. Fl. Ind. t. 39.

KASOOM: Curtis 3243. PENANG: back of West Hill at 2000 feet, Curtis 3460. PERAK: King's Collector 5153. MALACCA: at Bukit Burang, Goodenough 1423. SINGAPORE: Wallich 1568.—DISTRIB. Apparently wild in N. India. The shrub is commonly cultivated in gardens throughout India and Malaya.

4. *ERVATAMIA PEDUNCULARIS*, King & Gamble. A small shrub (small tree, King's Collector); branchlets slender, dichotomous, curved. *Leaves* membranous; elliptic or elliptic-oblong or oblong-lanceolate, obtusely long caudate-acuminate at apex, acute at base; glabrous, pale beneath; 4 to 9 in. long, 1.5 to 3 in. broad; midrib slender; main nerves 12 to 20 pairs, parallel, starting at an angle of about  $60^{\circ}$  with the midrib and curving upwards to join in an intramarginal looped nerve; secondary nerves none; reticulations transverse, faint; petiole .25 to .4 in. long, slender at first, afterwards thickening, the base enlarged, half-stem-clasping with a stipular scale within. *Cymes* glabrous, usually in pairs, axillary, on 2 to 5 in. long slender peduncles; branches widely divaricate; secondary peduncles .75 to 1 in. long; pedicels capillary, .2 to .3 in. long; bracteoles minute; flowers white; buds slender, clavate. *Calyx*-tube short; lobes ovate, rounded, glandular within on the middle, .025 in. long. *Corolla*-tube very slender, straight or slightly curved, .4 to .5 in. long, inflated at the top opposite the stamens; mouth naked, slightly pubescent within below the stamens. *Anthers* lanceolate, slightly mucronate. *Ovary* of 2 glabrous carpels; carpels elongate; style very slender; stigma clavate, bifid at apex just beneath the anthers. *Follicles* stipitate, twisted, oblong or rhomboid,

beaked; the beak recurved, .4 to .6 in. long, .4 in. broad, 1- to 2-seeded. *Seeds* bluntly angled, enclosed in a thin red fleshy aril; testa crustaceous, sulcate, the furrows pressing inwards, rough, glandular; albumen copious; cotyledons cordate, .15 in. long; radicle cylindric. *Tabernaemontana peduncularis*, Wall. Cat. 1575 and in Bot. Reg. under t. 1273; A. DC. Prodr. VIII. 376; Miq. Fl. Ind. Bat. II. 421; Hook. f. Fl. Br. Ind. III. 647.

KEDAH: at Langkawi Island, *Curtis* 2536. PENANG: *Porter* (*Wallich* 1575); *Maingay* (K.D.) 1060/2; *Curtis* 790. PERAK: *Curtis*; *Wray* 1892, 1962, 1975; *Scortechini* 83, 226, 724; *Ridley* 9750; *King's Collector* 846, 1858. SELANGOR: *Ridley* 8555. MALACCA: *Derry* 1014.

5. *ERVATAMIA CYLINDROCARPA*, King & Gamble, n. sp. A shrub reaching 4 to 6 feet in height; branchlets slender, dichotomous, pale brown, smooth. *Leaves* membranous; lanceolate, oblong-lanceolate, or elliptic-lanceolate, sharply or sometimes bluntly caudate-acuminate at apex, the acumen curved sideways, attenuate at base; light green above when young, darker when old, paler beneath; 4 to 7 in. long, 1 to 2.5 in. broad; midrib slender; main nerves 7 to 10 pairs, starting at an angle of about 60° to 70° with the midrib, and at once curving upwards to anastomose a little short of the margin; secondary nerves few; reticulations inconspicuous; petiole .25 in. long, slender. *Cymes* axillary or terminal, single or in pairs, divaricately branched; peduncles slender, .5 to 1 in. long; secondary peduncles as long, dichotomously branched; pedicels slender, .25 to .5 in. long; bracteoles minute, very caducous; flowers few in each cyme, waxy white with a yellow centre; buds rather stoutly clavate, acute at tip. *Calyx*-tube very short; lobes lanceolate or linear-lanceolate, unequal, .3 to .4 in. long, acute, with large glands inside near the base, midrib prominent. *Corolla*-tube funnel-shaped in bud, cylindric in flower; dilated above opposite the stamens, .4 to .5 in. long, glabrous on both surfaces; lobes oblong, spreading, rather broad, .5 in. long, rounded at top. *Anthers* linear-acute, .1 in. long; pollen-grains globose, with projecting bosses. *Ovary* of 2 carpels, rounded at top; style slender; stigma clavate, with a bifid point. *Follicles* widely divaricate, from 110° to nearly in the same line, cylindric, acute both at base and tip, scarcely recurved, 1.5 to 3 in. long, not keeled. *Seeds* up to 10, ovoid, .3 in. long, sulcate ventrally, enclosed in a fleshy aril; testa crustaceous, glandular, ribbed, the ribs extending into the copious albumen; cotyledons cordate; radicle cylindric.

PERAK: *Wray* 158, 1857, 2806, 3117, 4027; *Scortechini* 144, 438, 920, 964; *King's Collector* 1060, 2081, 3006, 10061, 10264. DINDINGS: *Ridley*, 7935, 8360, 8631, 10291.

6. *ERVATAMIA MALACCENSIS*, King & Gamble. A slender glabrous



shrub, reaching 6 to 8 ft. in height; branchlets slender, dichotomous, smooth. *Leaves* membranous; lanceolate to elliptic-obovate, obtusely caudate-acuminate at apex, the acumen often twisted sideways, attenuate at base; yellowish-green when fresh, pale brown when dry; 1.5 to 4 in. long, .5 to 1.5 in. broad; midrib slender, raised beneath; main nerves very slender, 6 to 9 pairs, starting at an angle of from 50° to 60° with the midrib, and curving upwards to join in an inconspicuous intra-marginal looped nerve; secondary nerves very few; reticulations few, faint; petiole .5 to .25 in. long, winged by the decurrent margins of the blade, half-stem-clasping at base with a stipular ridge at the node and a ligule-like gland within. *Cymes* axillary, sessile or shortly peduncled, few- (1- to 6-) flowered; pedicels slender, curved, .25 to .75 in. long; bracteoles minute, caducous; flowers white with a yellow centre, or pale yellow; buds very slender, clavate, rounded at top. *Calyx*-tube short; lobes lanceolate, acuminate, glandular within, unequal, .15 to .2 in. long, with a strong midrib nerve. *Corolla*-tube very slender, dilated at top opposite the stamens and there twisted, .5 to .7 in. long, glabrous except for a slight pubescence within below the anthers; lobes narrow, oblong, folded in bud, crisped on the margins, .4 to .5 in. long, .1 in. broad. *Anthers* slender, .15 in. long; filaments short, ciliate, decurrent in lines in the corolla-tube. *Ovary* short, rounded; style long, filiform; stigma clavate, apiculate. *Follicles* yellow, oblong-falcate, beak acute, base sessile; 3-keeled, the keels prominent; .75 to 1.25 in. long, .4 to .5 in. thick, 6- or more-seeded. *Seeds* ovoid or rhomboid, .3 to .4 in. long, surrounded by a reddish aril; testa crustaceous, grooved ventrally with a branching groove, furrowed longitudinally, the furrows intruded into the albumen; albumen copious; cotyledons cordate, rounded, .25 in. long; radicle stout, cylindric. *Tabernaemontana malaccensis*, Hook. f. in Fl. Br. Ind. III. 649.

PERAK: *Scortechini* 2024; *King's Collector* 1061, 4391. MALACCA: *Griffith*; *Maingay* (K.D.) 1061, 1062; *Derry* 87; *Hervey*. SELANGOR: *Curtis* 2353. SINGAPORE: *Hullett* 521 (this specimen has very small leaves and rather larger more recurved follicles).

7. *ERVATAMIA CURTISII*, King & Gamble, n. sp. A shrub; branchlets slender, dichotomous, pale brown, striate when dry. *Leaves* membranous; lanceolate or oblong-lanceolate, caudate-acuminate at apex, attenuate at base; glabrous, green above, pale beneath; margins slightly recurved; 3 to 6 in. long, 1 to 1.5 in. broad; midrib slender, prominent beneath; main nerves 9 to 12 pairs, starting at an angle of about 70° with the midrib and at once curving upwards to and along the margin; secondary nerves and reticulations very indistinct; petiole .2 to .3 in. long, winged by the decurrent margins of the blade so as to be

practically sessile; the base half-stem-clasping and forming a stipular ridge at the node, with a ligule-like gland within. *Cymes* axillary, usually to the second pair of leaves from the top of the branchlet; generally in pairs, about 6- to 10-flowered; peduncles slender, .5 to 1 in. long; pedicels very slender, about .5 to .6 in. long; buds slender, clavate, somewhat acute at tip. *Calyx*-tube almost none; lobes linear-lanceolate, unequal, .1 to .15 in. long, with a large round gland at the base within, usually supporting 3 smaller linear ones. *Corolla*-tube slender, .6 to .7 in. long, slightly inflated at top opposite the stamens, glabrous within and without; lobes narrow, oblong, undulately crispate, .5 in. long. *Anthers* linear, acute or slightly mucronate, .08 in. long; filaments short, decurrent in lines within the tube. *Ovary* of two rounded carpels; style very slender; stigma clavate, bifid at tip. *Follicles* horizontally divaricate, ovoid, long-acuminately beaked, not keeled or recurved, bright orange in colour, 1 to 1.5 in. long, about .4 in. broad. *Seeds* about 6 to 8, obtusely angular, .25 to .35 in. in diameter, deeply hollowed ventrally, enveloped in a crimson aril; testa brown, glandular, furrowed, the furrows deeply indented in the copious waxy albumen; cotyledons cordate, .1 in. in diameter; radicle cylindric, .15 in. long.

PENANG: at the Waterfall. *Curtis* 1775. PERAK: at Kuala Wok, *Wray* 852; *Scortechini* 63.

We have been somewhat in doubt whether *Wray's* and *Scortechini's* fruiting specimens really belong to the same plant as *Curtis's* excellent flowering ones, but after long consideration believe we are right in considering that they do.

8. *ERVATAMIA POLYNEURA*, King & Gamble. A slender glabrous shrub, reaching 20 feet in height; branchlets thick, very milky, dark brown, very prominently marked by the broad scars of fallen leaves. *Leaves* very coriaceous; elliptic or elliptic-ovate or elliptic-oblong, obtuse or bluntly acute at apex, somewhat rounded at base; yellowish-brown when dry, upper surface green when fresh, wrinkled when dry, lower pale, dotted; margins recurved, slightly so in flower, strongly in fruit; 6 to 12 in. long, 2 to 3 in. broad; one of each pair usually smaller than the other; midrib very stout, prominently raised on the lower, depressed and keeled on the upper, surface; main nerves 20 to 35 pairs, parallel, starting at right angles to the midrib and only very slightly curving to meet in a looped intramarginal nerve, all very indistinct, as are the reticulations; petiole stout, .4 to .8 in. long, bordered by the decurrent margins of the blade, bases enlarged, furnished with axillary glands, and those of each pair joined by a stipular ridge. *Cymes* axillary, usually in pairs in the axils of the uppermost pair of leaves but one, dichotomous, 12- to 16-flowered, corymbose;

peduncles very stout, 1·5 to 2·5 in. long; pedicels thick, curved, about ·3 to ·6 in. long; in fruit the non-fruiting pedicels caducous, leaving broad prominent oblong scars; bracts small, entire, rounded; flowers scented; buds clavate, with large obtuse heads, ·3 in. in diameter. *Calyx*-tube short, thick; lobes ovate, obtuse, ·1 to ·15 in. long, with many small subulate glands in a row at the base within. *Corolla*-tube cylindric, ·5 in. long, slightly dilated at two-fifths of the way up, funnel-shaped at the mouth, glabrous on both sides; lobes overlapping to the left, folded in bud, oblong, obtuse, up to 1 in. long. *Stamens* inserted at the dilatation; anthers linear, mucronate, ·15 in. long; pollen-grains globose with small protruded round knobs. *Ovary* of two separate conical carpels; style short; stigma clavate, the apiculus bifid. *Follicles* orange, 1 to 1·5 in. long, ·5 in. broad, falcate, dorsal edge straight, ventral edge much rounded, keels 3; beak long, usually hooked. *Seeds* about 4 to 6, ovoid or rhomboid, enveloped in a scarlet aril, deeply sulcate ventrally; testa crustaceous, glandular, ridged within; albumen copious. *Tabernæmontana polyneura*, Scortechini MS. in Herb. Calc.

PERAK: at Bujoy Malacca, *Scortechini* 1867. MALACCA: *Miller* 9.

A very distinct plant, quite different in texture and appearance to any other herein described, but coming near to *Tabernæmontana dichotoma*, Roxb., of S. India and Ceylon. The description is largely after Scortechini.

### Tribe III.—ECHITIDÆ.

#### Subtribe 1.—PARSONSIINÆ.

##### 15. PARSONSIA, Br.

Twining shrubs. *Leaves* opposite. *Flowers* small, white, in terminal or axillary di-tri-chotomous cymes or thyrses. *Calyx* 5-partite, eglandular or 5-scaled or minutely many-glandular at the base within. *Corolla* tubular; tube short, cylindric or subglobose, naked at the throat; lobes 5, slightly twisted, overlapping to the right. *Stamens* inserted on the tube; filaments often twisted; anthers half-exsert, oblong-lanceolate or linear, acute, conniving round the stigma and adhering to it, the cells produced at the base into empty rigid appendages. *Disk* of 5 lobes or scales. *Ovary* 2-celled; ovules many in each cell; style filiform, dilated at the top, truncate; stigma columnar or elongate-conic. *Fruit* cylindric, of two follicular mericarps, long cohering but at length separating from the two placentas. *Seeds* linear or oblong, attenuate and comose at the apex; albumen scanty; cotyledons oblong-linear, flat; radicle superior.—DISTRIB. About 12 species, of Tropical Asia, Australia and New Zealand.

Filaments of the stamens twisted spirally around the style; corolla-lobes .2 in. long:—

- Leaves more or less oblong, with 6 to 8 pairs of main nerves; corolla glabrous without; fruit 4 to 7 in. long .. 1. *P. spiralis*.  
 Leaves more or less ovate, with 10 to 12 pairs of main nerves; corolla pubescent without; fruit 2.5 to 3 in. long .. 2. *P. Kunstleri*.

Filaments of the stamens not twisted spirally around the style:—

- Corolla-tube cylindric-urceolate, lobes spreading, .075 in. long; disk deeply lobed; calyx-lobes with no or very small scales at base within; main nerves of leaves 6 to 8 pairs .. 3. *P. stenocarpa*.  
 Corolla-tube campanulate, lobes erect, .3 in. long; disk entire or undulate; calyx-lobes with a broad thin scale at base within; main nerves of leaves 8 to 10 pairs .. 4. *P. penangiana*.

1. *PARSONSIA SPIRALIS*, Wall. Cat. 1631 (1828). An evergreen twining glabrous shrub; branchlets terete. *Leaves* subcoriaceous when green, membranous when dry; ovate-oblong or oblong-lanceolate, shortly somewhat abruptly and often obliquely acuminate at apex, acute or rounded at base; pale when dry, especially on the lower surface; 3 to 7 in. long, 1.5 to 3.5 in. broad; midrib rather broad, slightly raised beneath; main nerves 6 to 8 pairs, the lowest pair close to the base, starting at an angle of about 60° and arching upwards to anastomose near the margin; secondary nerves few, also the reticulations; petiole slender, .5 to 1 in. long, often twisted at base; stipular glands small, subulate, the bases of each pair connected by a stipular ridge. *Cymes* axillary, many-flowered, corymbose, 1.5 to 3 in. in diameter; peduncles variable in length, 1 to 4 in. long; secondary peduncles usually 3, .5 to 1 in. long; branches usually 3-chotomous; ultimate pedicels slender, about .25 in. long; bracts and bracteoles small, ovate; flowers greenish or yellowish with a red centre; buds clavate, with short tube and obtusely conical top. *Calyx*-tube short; lobes ovate, acute, ciliate, sparsely pubescent without, .1 in. long, furnished with an ovate-acute sometimes bifid scale at the base of each inside. *Corolla*-tube cylindric, .125 in. long, glabrous on both surfaces, villous at the throat; lobes .2 in. long, oblong, acute, erect or spreading. *Disk*-lobes triangular. *Stamens* inserted near the base of the tube; the filaments spirally twisted together, sparsely pubescent; anther-tails incurved at the base, anther-tips acuminate, hooked. *Ovary* ovoid, glabrous; style slender; stigma columnar with a bifid apex and short basal auricular ring. *Fruit* linear-lanceolate, acuminate, 4 to 7 in. long, .75 in. broad, somewhat compressed, smooth, striate, glabrous. *Seeds* .5 to .75 in. long, slender, enlarged below, narrowed and cut away on one side above, and furnished with pale golden-brown coma, .75 to 1.5 in. long; cotyledons narrow, oblong, about .25 in. long; radicle



·1 in. long, slender. A. DC. Prodr. VIII. 402; Kurz For. Fl. II. 180; Hook. f. Fl. Br. Ind. III. 650; Trimen Fl. Ceyl. III. 134; Cooke Fl. Bomb. II. 135. *P. oblonga*, Wall. Cat. 1632; A. DC. l. c. *P. pauciflora* and *P. acuminata*, Wall. Cat. 1633, 1634. *Helygia javanica*, Blume Bijdr. 1043. *Heligme javanica*, A. DC. l. c. 425; Miq. Fl. Ind. Bat. II. 429. *H. Rheedii*, Wight Ic. t. 1303. *Spirostemon spiralis*, Griff. Notul. IV. 80, t. 411, fig. 1. *Aganosma concanensis*, Hook. Ic. Pl. t. 841. "*Kudici Kodi*," Rheed Hort. Mal. IX. t. 9, 10.

KEDAH: on Lankawi Island, *Curtis*; at Coah, *Curtis* 450, 2109.

PENANG: *Wallich* 1634; *Curtis* 1707. PERAK: *Wray* 2244. MALACCA: *Maingay* (K.D.) 1064. SINGAPORE: *Wallich* 1633; *Lobb*; *Kunstler* 69.

—DISTRIB. India, Ceylon, Burma, Malay Archipelago, China.

2. *PARSONSIA KUNSTLERI*, King & Gamble, n. sp. A slender climbing shrub; branchlets terete, pale to dark brown. *Leaves* membranous; ovate or ovate-lanceolate, acuminate at apex, rounded or acute at base; yellowish-green when fresh with reddish nerves beneath, dark brown and dull when dry, lower surface paler; sometimes slightly puberulous, especially on the nerves beneath; 3 to 6 in. long, 1·5 to 3 in. broad; midrib slender, raised above and sinuate when dry, raised beneath; main nerves 10 to 12 pairs, the lowest usually close to the margin, starting at an angle of 60° and curving upwards to and along the margin, raised on both surfaces when dry; secondary nerves few, chiefly between the upper main nerves; reticulations obliquely transverse, prominent on the lower surface; petiole slender, twisted, variable in length from ·25 to 1·25 in. long, the base swollen, those of each pair joined by a nodal ridge with small acute stipular glands. *Cymes* axillary, corymbose, many-flowered, 2-chotomous, reaching 7 in. in length and about 3 in. in diam.; peduncles slender, curved, 3 to 5 in. long; secondary peduncles usually 3, 1·5 to 2 in. long; cymules about 10- to 12-flowered; pedicels slender, ·15 to ·25 in. long; bracteoles ovate-acute, puberulous, ·05 to ·1 in. long; buds clavate, with short tube and conical head; flowers dark yellow without, reddish within. *Calyx*-tube short; lobes ovate, acute, ciliate, pubescent without, ·1 in. long, furnished each with an ovate acute, sometimes emarginate scale at its base within. *Corolla*-tube cylindric below, ·15 in. long, pubescent without, villous within at the mouth and between the filaments; lobes oblong, acute, ·2 in. long, pubescent without, glabrous within. *Disk*-lobes triangular, blunt; ·025 in. long, glabrous. *Stamens* inserted near the base of the tube; the filaments twisted, sparsely villous; anther-tails incurved at the base, anther-tips blunt with a small membranous tip. *Ovary* ovoid, glabrous; style slender; stigma columnar with a conical sometimes bifid tip and basal spreading annular ring. *Fruit* linear-lanceolate,

acuminate, 2·5 to 3 in. long and ·2 to ·3 in. broad, glabrous, terete, slightly compressed, the mericarps at length separating. *Seeds* slender, ·4 to ·5 in. long, narrowly linear, constricted above and acuminate below, tipped with a 1 in. long coma of pale silky hairs; cotyledons narrow; radicle slender.

PERAK: in low-lying localities, *Kunstler (King's Collector)* 1824, 5650.

3. *PARSONSIA STENOCARPA*, King & Gamble, n. sp. A slender twining shrub; branchlets terete, older somewhat channelled; innovations minutely rusty-pubescent. *Leaves* membranous; ovate-lanceolate shortly acute at apex, cuneate or sometimes slightly rounded at base; both surfaces sparsely but minutely pubescent when young, glabrous when old; margins recurved; 2 to 4 in. long, 1 to 2 in. broad; midrib slender; main nerves 6 to 8 pairs, slender, at about 50° with the midrib, the lowest pair less, curving upwards to anastomose near the margin, faint but apparent on the lower surface, as are the reticulations; petiole variable in length, ·25 to 1 in. long, slender, often twisted near the base; stipular glands very small. *Cymes* axillary, few- (8- to 10-) flowered, umbellate, pubescent; peduncles about 1 in. long; pedicels slender, ·2 in. long in flower, ·3 in. long and rather thick in fruit; bracteoles minute, subulate; flowers light yellow; buds short, oblong-conical. *Calyx*-tube very short; lobes ovate-acuminate, ·125 in. long; scales very small or none. *Corolla*-tube cylindric-urceolate, ·15 in. long, densely pubescent within in the upper part; lobes ovate-acuminate, spreading, ·075 in. long. *Disk*-lobes oblong, emarginate, ·025 in. long. *Stamens* inserted near the base of the corolla-tube; filaments slender, radiating to the centre, but not spirally twisted; anthers hastate acuminate, the tails spreading outwards. *Ovary* ovoid-conical; style slender; stigma columnar with a bifid apiculus at tip and a ring at base. *Fruit* linear, terete, 5 to 7 in. long, ·2 in. broad, rather quickly separating into two terete mericarps; placentas flat, very thin. *Seeds* ·5 in. long, slender, slightly enlarged below, narrowed above and furnished with a coma of golden-silky hairs about 1 in. long; cotyledons oblong, ·15 in. long; radicle slender, ·1 in. long.

PERAK: *Scortechini* 1292; *Wray* 3263; *King's Collector* 6062—in dense jungle, at 300 to 500 feet, clinging to trees.

*P. curvisepala*, K. Schum., of New Guinea, is very near this indeed, and scarcely seems to differ, except in the greater hairiness, in the corolla-lobes being quite valvate (*Lyonsia*?), and in the calyx-lobes being much recurved.

4. *PARSONSIA PENANGIANA*, King & Gamble, n. sp. A climbing shrub; branchlets slender, dark brown, terete, internodes long. *Leaves* membranous; ovate, acuminate at apex, truncate or rounded at base;

both surfaces olivaceous brown, the lower the paler; margin slightly recurved; 5 to 7·5 in. long, 3 to 4 in. broad; midrib slender, prominent beneath; main nerves 8 to 10 pairs, the lowest pair close to the margin, those succeeding gradually further apart to above the middle, at an angle of 60° to 70° with the midrib, curving upwards to anastomose near the margin; secondary nerves none; reticulations transverse, distant, oblique; petiole 1 to 1·25 in. long, slender, bordered above by the decurrent margins of the blade. *Cymes* in axillary, corymbose, puberulous panicles; peduncle slender, 1·5 in. long, flattened; branches few, also flattened but shorter; bracteoles ovate, acute; pedicels 1 to 2 in. long, slender; buds ovoid, acute; flowers yellowish-white. *Calyx*-tube short; lobes triangular-ovate, 0·75 in. long, bluntly acuminate, ciliate, each with a broad short very thin scale nearly equalling the base within. *Corolla*-tube campanulate, not at all constricted, 3 in. long; lobes as long as tube, ovate-acute, the tip entire or notched, pubescent without, glabrous within, except the shaggy-villous ring at the insertion of the filaments. *Stamens* half-exsert, inserted a little below the top of the tube; filaments long, shaggy-villous, curved inwards to meet and then upwards but scarcely spiral; anthers long, sagittate, the spurs much incurved, the tip membranous-apiculate. *Disk* cylindrical, entire or slightly undulately lobed, 0·6 in. high, glabrous, fully enclosing the carpels. *Carpels* rounded, glabrous, at first connate, afterwards separating; style slender, conical above; stigma conical, with a spreading ring below and short often bifid tip. *Fruit* unknown.

PENANG: at the Waterfall, *Curtis*.

*Curtis* says this is a rare plant. It differs from the other species in the not constricted campanulate corolla-tube, the very broad scale at the base of the calyx within, and the entire cylindrical disk. When the fruit is known it may perhaps be found to require a new genus.

#### 16. VALLARIS, Burm.

Climbing or erect shrubs, or trees. *Leaves* opposite, minutely dotted. *Flowers* white, in axillary fascicles or in dichotomous pseudo-axillary cymes. *Calyx* 5-partite, glandular or not within; lobes narrow. *Corolla* hypocrateriform or subrotate; throat naked; tube short; lobes broad, contorted, overlapping to the right. *Stamens* inserted at the top of the tube of the corolla, partly exsert; filaments short; anthers sagittate, acuminate, conniving in a cone around and adherent to the stigma; the connective furnished with a large or small dorsal gland; cells with rigid basal spurs. *Disk* annular or cupular, with 5 lobes or scales. *Ovary* of 2 carpels, which are at first connate; ovules many in each carpel; style filiform; stigma thick, obscurely annular at base, often 2-lobed at the tip. *Fruit* oblong, acuminate, separating into 2

follicular mericarps. *Seeds* biseriate, ovate, acuminate or beaked, the apex furnished with a coma; albumen scanty or copious; cotyledons thin or fleshy, large; radicle cylindric, superior.—**DISTRIB.** Tropical Asia, in India and Malaya; species 5 or 6.

A climbing shrub; flowers in branching cymes; anthers with a large dorsal gland .. .. 1. *V. Pergulana*.

Shrubs or trees; flowers in fascicles:—

Flowers large; leaves 3 to 4·5 in. long, ·75 to 2 in. broad;

anthers with a large dorsal gland .. .. 2. *V. Maingayi*.

Flowers small; leaves 1 to 2 in. long, ·5 to ·75 in. broad;

anthers with a small dorsal gland .. .. 3. *V. lancifolia*.

1. **VALLARIS PERGULANA**, Burm. Fl. Ind. 51 (1768). A climbing shrub, with an unpleasant odour; branchlets terete, pale brown. *Leaves* membranous; broadly elliptic or obovate, abruptly and shortly acute at apex, cuneate at base or sometimes rounded; both surfaces glabrous, the lower sometimes puberulous especially on the nerves; 4 to 7 in. long, 3 to 4 in. broad; midrib slender, impressed above; main nerves 7 to 9 pairs, at an angle of from 50° to 60° with the midrib, straight at first, curving and anastomosing near the margin, the upper ones meeting a looped nerve; secondary nerves very few; reticulations transverse, prominent; petiole ·75 to 1·5 in. long, slender. *Cymes* lax, usually supra-axillary, puberulous, reaching 3 in. in length and 4 in. in breadth; peduncles short, under ·5 in. long; branches dichotomous; pedicels slender, ·25 to ·5 in. long; buds obovate, acute; flowers white. *Calyx*-tube very short, pubescent without; lobes lanceolate, acuminate, ·3 in. long, pubescent; glands very small, alternate with the lobes. *Corolla*-tube hypocrateriform; tube short, cylindric, ·2 in. long, nearly glabrous; limb ·35 in. long, cleft half-way down in ovate abruptly acuminate lobes, pubescent on both sides. *Disk* of 5 rounded villous lobes, incurved at tip. *Stamens* inserted near the top of the tube within; filaments thick, partly decurrent; anthers sagittate, short-apiculate, exserted, ·2 in. long, the tails slender incurved, the dorsal surface with a large fleshy glabrous rounded gland at the forking of the cells. *Ovary* rounded, densely white-villous; style slender; stigma conical, with a rounded tip and bifid apiculus. *Fruit* not known. A. DC. Prodr. VIII. 399; Wight Ic. t. 429; Hook. Ic. Pl. t. 153 (*V. Pergularia* by error); Hook. f. Fl. Br. Ind. II. 651. *V. ovalis*, Miq. Fl. Ind. Bat. II. 427. *Pergularia glabra*, Linn. Mant. 53. *Emericia Pergularia*, Roem. & Sch. Syst. IV. 401. *Echites hircosa*, Roxb. Fl. Ind. II. 18. "*Flos Pergulanus*," Rumph. Herb. Amb. V. 51, t. 29, fig. 2.

MALACCA: *Griffith*; *Maingay* (K.D.) 1063, cultivated. — **DISTRIB.** India (Bengal?), Ceylon, Malay Archipelago, Siam.



2. *VALLARIS MAINGAYI*, Hook. f. in Fl. Br. Ind. III. 651 (1882). A large tree (Maingay), a tree 40 to 50 feet high (Curtis); branches stout, with black bark; branchlets closely ringed with transverse cracks. *Leaves* coriaceous; elliptic-lanceolate, obtusely acuminate at apex, acuminate at base; upper surface dark greenish-brown, lower pale, glabrous; 3 to 4·5 in. long, ·75 to 2 in. broad; midrib slender, impressed above; main nerves 5 to 6 pairs, prominent beneath, curving upwards to and along the margin; secondary nerves and reticulations distinct beneath; petiole ·2 to ·4 in. long, black. *Flowers* fascicled, 4 to 12 together in one of the axils of each pair of leaves, on alternate sides; the base of the fascicle forming a short tubercle; pedicels variable in length, ·2 to ·5 in., slender or stout, slightly enlarged under the calyx; bracts or bracteoles none; buds about ·5 in. long, tube and conical head of lobes about equal. *Calyx*-tube short; lobes ovate, acute, ciliate, ·06 in. long; glands alternate with the lobes, very small. *Corolla*-tube urceolate, ·25 in. long, mouth constricted; lobes broad, ovate-oblong, folded in bud, ·3 in. to ·4 in. long, pubescent on the inner surface. *Anthers* half-exserted, apiculate, hairy on the ventral surface, a line of hairs near the tip on the dorsal surface; dorsal gland large. *Disk* annular, glabrous, with 5 rounded lobes, ·05 in. high. *Ovary* conical, pubescent, of two combined carpels; style slender; stigma conical, ringed and hairy below. *Fruit* not known.

PENANG: at Batu Feringy and at Government Hill, 2,000 feet, Curtis 1767, 2748. MALACCA: *Maingay* (K.D.) 1084. SINGAPORE: Ridley 4917.

Haviland's 3050 from Kalong, Borneo, is clearly a species closely allied to this.

3. *VALLARIS LANCIFOLIA*, Hook. f. Fl. Br. Ind. III. 651 (1882). A rather stiff epiphytic shrub; branches stout, dark greyish-brown, somewhat angled, studded with many conspicuous corky wart-like lenticels; branchlets very slender, pale grey, twiggy. *Leaves* chartaceous; ovate, caudate-acuminate at apex, cuneate at base; glabrous on both surfaces; 1 to 2 in. long, ·5 to ·75 in. broad; midrib slender; main nerves very oblique; inconspicuous, parallel, 8 to 10 pairs, joined by an intramarginal slightly looped nerve; reticulations oblique, indistinct; petiole slender, ·1 to ·25 in. long. *Cymes* axillary, few-flowered, short (about ·5 in. long); peduncles about ·1 to ·2 in. long, slender; pedicels very slender, ·25 in. long; bracteoles minute, ovate-acute; flowers white. *Calyx*-lobes ovate, acute, ciliate, with 2 rounded fimbriate scales at the base of each; tube as long as lobes. *Corolla* hypocrateriform; tube cylindric, ·15 in. long, narrowed upwards, pubescent within; lobes linear-oblong, ·2 in. long, villous at the throat. *Disk* 5-lobed; lobes erose. *Stamens*

inserted near the top of the tube; filaments slender; anthers half-exsert, sagittate, the tip membranous, the spurs slender, rather short; dorsal gland narrow, inconspicuous. *Ovary* of 2 glabrous ovate carpels; style slender, with a cup-shaped top; stigma almost globose, with a short tip. *Fruit* not seen.

PENANG: on Government Hill, 1,900 feet, *Fox* 33; *Curtis* 2146. PERAK: at Goping, *King's Collector* 4273. MALACCA: *Maingay* (K.D.) 1102.

#### 17. POTTSIA, Hook. & Arn.

Climbing shrub. *Leaves* opposite, with distant nerves. *Flowers* small, in lax large terminal and axillary trichotomous paniculate cymes. *Calyx* small, 5-partite, with a ring of small glands within at the base of each lobe. *Corolla* hypocrateriform; tube cylindric, constricted and naked at the throat; lobes 5, overlapping to the right, only slightly twisted, spreading. *Stamens* inserted at the mouth of the corolla-tube; filaments short; anthers exsert, sagittate, connivent in a cone round the stigma; cells with basal empty spurs. *Disk* annular, deeply 5-lobed. *Ovary* of 2 distinct carpels; style thickened in the middle, attenuate at base and under the ovoid-conical stigma; ovules many in each carpel. *Fruit* of two follicular mericarps, which are thin, terete, subtorulose. *Seeds* linear, elongate, not beaked, with a deciduous coma; albumen copious; cotyledons linear, flat; radicle superior.—DISTRIB. One species, Indian and Malayan.

POTTSIA CANTONENSIS, Hook. & Arn. Bot. Beech. Voy. 199, t. 43 (1836). A large climbing shrub; branches terete, cylindric; branchlets and innovations puberulous. *Leaves* membranous; ovate or elliptic-ovate, acuminate (usually abruptly and obtusely) at apex, rounded or subcordate at base; glabrous above, also beneath except for slight pubescence along the midrib; 2 to 4 in. long, 1 to 2·5 in. broad; midrib slender, much raised beneath; main nerves 5 to 6 pairs, distant, curved upwards to and along the margin; reticulations in a fine net-work; petiole slender, .75 to 1 in. long, minutely pubescent, the bases of each pair joined in a thin ridge at the nodes. *Inflorescence* 4 to 6 in. long, 6 to 10 in. broad at top; of trichotomous panicles ending in corymbose drooping cymes; primary peduncles 2 to 4 in. long, slender; secondary 1 to 2 in. long; rest slender, all rusty puberulous or glabrate; pedicels very slender, .5 in. long; basal bracts leafy; bracteoles minute, ovate, ciliate, caducous; buds slender, clavate; flowers pink. *Calyx*-tube very short; lobes ovate, each with 1 to 4 minute scales at the base inside. *Corolla*-tube cylindric-campanulate, slightly constricted at mouth, .15 to .2 in. long; lobes spreading, ovate, .15 in. long, 3-nerved, margins recurved. *Anthers* sagittate, smooth on the back with a very small

gland near the apex, which is often hooked; basal cells slender, incurved; filaments pubescent, decurrent inside the corolla-tube in a white-pubescent ridge to a little way above the base. *Disk*-lobes linear-subulate, .1 in. long. *Ovary*-carpels short, oblong, pubescent at top; stigma obscurely ribbed. *Follicles* very slender, 1 foot long, flexuous, smooth, thinly coriaceous. *Seeds* black, very slender, glabrous, flat, 1 in. long, .075 in. broad, enlarged at the apex where they bear the coma; coma white, 1 to 1.5 in. long; albumen thin; cotyledons linear-oblong; radicle slender. Benth. Fl. Hongk. 222; Kurz For. Fl. II. 190, and Journ. As. Soc. Beng. XLVI. ii. 255; Miq. Fl. Ind. Bat. II. 450. *P. ovata*, A. DC. Prodr. VIII. 442. *P. Hookeriana*, Wight Ic. t. 1306 bis. *Parsonsia ovata*, Wall. Cat. 1630. *Teysmannia laxiflora* and *Hookeriana*, Miq. l. c. 455, 456; and *Parapottsia*, Addenda 1080. *Vallaris laxiflora*, Blume Bijdr. 1043. *Euthodon paniculata*, Griff. Notul. IV. 84; Ic. Pl. Asiat. t. 458, fig. 2.

KEDAH: Ridley. PENANG: Curtis 820. PERAK: Wray 1904; Scortechini 1287, 1289; Curtis 3337; King's Collector 1318, 4657, 5532, 10292, 10988. MALACCA: Griffith; Maingay (K.D.) 1095. — DISTRIB. India (E. Bengal and Assam), Burma, Java, S. China.

#### 18. WRIGHTIA, Br.

Shrubs or small trees, with often slender branches. *Leaves* opposite, penniveined. *Flowers* red, white, or yellowish, in terminal or pseudo-axillary corymb-like cymes. *Calyx* short, 5-partite, with glands or scales inside; lobes obtuse. *Corolla* hypocrateriform; tube cylindric, usually short, usually slightly constricted at the throat; lobes 5, overlapping to the left; the throat or the lower part of the lobes usually (absent in *W. religiosa*) furnished with a *corona* of 5 to 10 scales, which are often lobed or fimbriate, and either distinct or connate in a ring. *Stamens* inserted on the mouth of the tube; filaments short, dilated; anthers exserted (almost included in *W. dubia*), sagittate, conniving around and adhering to the stigma; cells usually near the summit, base produced in solid spurs. *Disk* 0. *Ovary* of 2 free or connate, many-ovuled, carpels; style filiform; stigma ovoid, with usually a toothed basal ring. *Fruit* of 2 connate or distinct follicular mericarps. *Seeds* linear, attenuate at the apex, base with a deciduous coma; albumen scanty or 0; cotyledons broad, convolute; radicle short, superior.—DISTRIB. Tropical Asia and Australia; about 10 species.

Throat of corolla furnished with a corona of scales or fringes:—

Corona-scales 10, 5 alternate with lobes of corolla, free, 2-lobed; 5 opposite those lobes, adnate below, free above,

3-lobed; leaves and inflorescence very tomentose; follicles connate .. ..	1. <i>W. javanica</i> .
Corona-scales many, fimbriate from the base; leaves and inflorescence glabrous; follicles connate .. ..	2. <i>W. levis</i> .
Corona-scales 5, small, alternate with the lobes of the corolla, not lobed; stamens almost included; flowers large; leaves scarcely pubescent; follicles distinct, connate at the tip only .. ..	3. <i>W. dubia</i> .
Throat of corolla without a corona; flowers very small as are also the leaves; pedicels capillary; follicles distinct ..	4. <i>W. religiosa</i> .

1. *WRIGHTIA JAVANICA*, A. DC. Prodr. VIII. 405 (1844). A small tree, reaching a height of 40 feet and a diameter of 12 to 14 in. (Curtis); branchlets slender, tomentose, as are the innovations and linear leaf-buds. *Leaves* membranous; elliptic or elliptic-lanceolate, abruptly and obtusely acuminate at apex, acute at base; upper surface minutely pubescent, glabrate when old; lower surface densely tomentose with ferruginous hairs; 3 to 5 in. long, 1 to 2·5 in. broad; midrib rather broad, scarcely raised; main nerves 10 to 12 pairs, nearly straight, reddish and sufficiently conspicuous beneath; reticulations obscure; petiole ·25 in. long, densely tomentose. *Cymes* terminal, tomentose, 1 to 1·5 in. long and 2 to 3 in. broad, many- (about 15- to 20-) flowered; peduncle none, or about ·25 in. long; branches 3-chotomous, about ·4 in. long; pedicels slender, ·2 to ·3 in. long; bracteoles minute, subulate; buds clavate, the tube short, the head ovoid, inflated, often ·5 to ·6 in. long and ·2 to ·3 in. broad; flowers pale waxy-white with greyish centre. *Calyx*-lobes ovate, acute, glabrous within, ·05 in. long; glands 2 to each lobe, elliptic, the two nearly covering the inside of the lobe. *Corolla*-tube short, ·15 in. long, slightly constricted at mouth, glabrous within; lobes oblong, rounded, ·5 in. long, at last spreading, puberulous on both surfaces. *Scales* 10; 5 alternate with corolla-lobes, free, inserted at base, ·2 to ·3 in. long, entire or bifid at apex, villous; 5 opposite the corolla-lobes, upper free part inserted nearly half-way up, very short and 2- to 3-lobed, villous, lower part adnate to the tube, glabrous or pubescent, twice as broad as the free ones. *Anthers* hard, stiff, pubescent, ·25 in. long, apiculus penicillate; filaments very short, thick, sometimes furnished behind with 2 minute subulate glands. *Fruit* 10 to 12 in. long, rough, prominently beaked; follicles connate. *Seeds* very slender, about ·6 in. long, excavate above; testa thin, striate; coma white, silky, 1·5 to 2 in. long; cotyledons broadly ovate, cordate, convolute, ·25 in. long, with prominent nerves; radicle short, stout, ·075 to ·1 in. long. Miq. Fl. Ind. Bat. II. 432; Koord. & Val. Bijdr. I. 112. *W. pubescens*, Blume Bijdr. 1041 not of Br.

KEDAH: at 300 to 500 feet, *King's Collector* 1762, TONGKA: *Curtis*



3054. PROVINCE WELLESLEY: at Tassek Glugor, *Curtis* 3738. —  
DISTRIB. Java (Koorders 13799, 13800, 13802, 14232).

In appearance this species would at first sight be taken for *W. tomentosa*, Roem. & Sch., but it is distinguished by the larger buds, shorter corolla-tube, and, above all, by the quite different corona-scales.

2. *WRIGHTIA LÆVIS*, Hook. f. in Fl. Br. Ind. III. 654 (1882). A glabrous shrub or small tree, reaching 15 to 20 feet in height; branchlets slender, terete, very pale brownish-yellow. *Leaves* membranous; elliptic or elliptic-oblong, abruptly caudate-acuminate at apex, cuneate at base; shining above, dull and pale beneath, blueish when dry; 3 to 6 in. long, 1 to 3 in. broad; midrib slender, raised and usually nearly white beneath; main nerves 4 to 7 pairs, the lowest pair very near the margin, all arching upwards to and along the margin; secondary nerves and transverse reticulations pale, forming an elegant network especially conspicuous below; petiole very short, .1 to .2 in. long. *Cymes* corymbose, 3-chotomous, pseudo-terminal, about 2 in. long and 2.5 in. broad; peduncles flattened, up to about 1 in. long; secondary peduncles also flattened, .25 to .3 in. long; pedicels slender, .5 to .75 in. long, often deflexed; bracteoles minute, ovate-lanceolate; flower-buds ovoid; flowers about .5 in. in diameter, blood-red (Maingay). *Calyx*-tube very short; lobes ovate, rounded, ciliolate, nerved, .06 in. long, each with 1 to 2 minute scales near the base. *Corolla*-tube very short, .05 in. long, glabrous; lobes oblong, minutely pubescent, .25 in. long; corona-scales fimbriate from the base, laciniae glabrous, .2 in. long. *Stamens* exsert; filaments very short, thick; anthers sagittate, the connective villous on both sides; cells near the top only, very short. *Ovary* ovoid, glabrous; style slender, with an obconic top; stigma short, rounded. *Follicles* 7 to 8 in. long, connate, slender. *Seeds* very long (1.5 in.), slender, glabrous, striate.

POONGAH: *Curtis* 2943. PERAK: at 300 ft., *Wray* 3504; *Scortechini* 63, 77; *King's Collector* 8614. MALACCA: on Mount Ophir, *Maingay* (K.D.) 1065. SELANGOR: *Ridley* 7566, at Ginting Bidai.—DISTRIB. Sumatra (*Forbes* 2605).

3. *WRIGHTIA DUBIA*, Spr. Syst. Veg. I. 638 (1825). A shrub, 2 to 8 feet high; branches stout, lenticellate; branchlets also thick, terete, pale brown, innovations minutely pubescent. *Leaves* chartaceous; oblong- or obovate-lanceolate, acuminate at apex, attenuate at base, sometimes almost rounded; dull on both surfaces, on the upper scaberrulous, scarcely pubescent, dark, paler beneath; 3 to 6 in. long, 1 to 1.5, rarely to 2, in. broad; midrib slender, smooth, pale, prominently raised beneath; main nerves 8 to 12 pairs, the lowest very close to the margin,

the rest at irregular distances but rather oblique, arching upwards to and along the margin; secondary nerves few, reticulations distinct, all pale and easily seen on the lower surface; petiole extremely short, 0 to .2 in. long. *Cymes* axillary and pseudo-terminal, few- (1- to 6-) flowered, secund; peduncles very short; pedicels pubescent, .25 in. long; bracteoles very small, pubescent, ovate-acute, sheathing the bases of the pedicels and at intervals along them; buds oblong-ovoid or fusiform, 1 to 1.5 in. long; flowers scarlet, orange without. *Calyx*-tube short; lobes ovate-acute, ciliolate, otherwise glabrous, .125 in. long, 3 of them with two small, thin, rounded, membranous, lobed scales at base, the scales one-third to one-half the length of the lobes. *Corolla* hypocrateriform; tube campanulate, .25 to .35 in. long; lobes spreading, .4 to .5 in. long, linear-oblong or -acuminate, glabrous on both surfaces as in the tube; mouth with 5 small, ligulate, rounded, corona-scales alternate with the lobes and sometimes joined by a slightly thickened ridge. *Stamens* only slightly exsert; filaments very broad; anthers sagittate, produced in a short membranous tip, the basal spurs straight or incurved; connective faintly pubescent on the back. *Ovary* glabrous, conical; style thick, .1 in. long; stigma conical, with an annular ring. *Follicles* distinct, at first cohering at the apex, 8 to 12 in. long, .25 in. broad, acuminate, striate. *Seeds* linear, .75 in. long, pointed at both ends, the lower furnished with a long, deciduous, white, silky coma; testa thin, striate; albumen very thin; cotyledons convolute, cordate, .25 in. long; radicle cylindric, .15 in. long. *Camararia dubia*, Sims Bot. Mag. t. 1646 (1814). *Strophanthus Jackianus*, Wall. Cat. 1643; A. DC. Prodr. VIII. 419; Miq. Fl. Ind. Bat. II. 442; Hook. f. Fl. Br. Ind. III. 655; Hook. Ic. Pl. t. 1521; Pax in Engl. Bot. Jahrb. XV. 380; Franchet in Nouv. Arch. Mus. Paris, 3, Sér. v. 260; Gilg in Engl. Monog. 12.

TRANG: in open jungle, on hilly ground at 200 to 300 ft., *Kunstler* 1400. JUNKSEYLON (Tongka): *Curtis*. PENANG: *Jack*; *Wallich* 1643; *Curtis* 188.

We consider that this species is rightly placed in this genus rather than in *Strophanthus*, on account of the structure of the seeds, but the stamens are much less exsert than is usual in *Wrightia*, and the corona-lobes are not cleft. There is in the Kew Herbarium an excellent drawing of a flowering and fruiting branch by Mrs. Hutton.

*Curtis's* No. 2915, from Junkseylon (Tongka), marked *Strophanthus* sp., an erect shrub 4 to 5 ft. high, with brick-red flowers, has exactly the flowers of *Wrightia dubia*, but the leaves are membranous, elliptic, short-acuminate at apex, cuneate at base, 7.5 in. long, and 2.75 in. broad. It cannot, however, be separated as a species, and may be called var. *membranifolia*, King & Gamble.

4. *WRIGHTIA RELIGIOSA*, Benth. in Gen. Pl. II. 713 (1876). A small shrub or tree; branches stiff, grey; branchlets also stiff, twiggy, innovations scabrous-papillose. *Leaves* membranous, small; ovate-lanceolate, obtusely acuminate at apex, cuneate at base, those of young shoots linear-oblong; glabrous on the upper surface except for the crisped pubescence on the midrib, glabrous on the lower, the midrib only slightly pubescent; .5 to 1.5 in. long, .3 to .7 in. broad, those of the shoots 2 to 2.5 in. long and .5 in. broad; midrib slender, crisped-pubescent; main nerves about 4 pairs (shoot-leaves up to 10 pairs or more), curved upwards to join in a faint intramarginal nerve; secondary nerves and reticulations inconspicuous; petiole slender, scarcely .1 in. long. *Cymes* terminal, few- (up to 12-) flowered; main peduncles fairly stout, flattened, .2 in. long; secondary peduncles 1 to 4, about .1 in. long; pedicels capillary, .5 to .7 in. long, curved and twisted; bracteoles minute, ovate; buds ovate-oblong; flowers white. *Calyx*-lobes ovate, acute, ciliate, with a few (about 5) blackish scales near the top of the tube inside. *Corolla*-tube cylindric, glabrous, .15 in. long; lobes ovate-orbicular, very thin, nervose, .25 to .3 in. long, glabrous; corona-scales none. *Stamens* long-exsert; filaments rather slender, .1 in. long; anthers linear-lanceolate, cells near the summit, connective thickened. *Ovary* ovoid, glabrous; style slender; stigma conical. *Follicles* straight, linear, terete, 3 to 6 in. long, divergent at an angle of about 20° to 40°. *Seeds* linear, .3 to .4 in. long, somewhat blunt at both ends, furnished below with a white silky coma 1 to 1.5 in. long; testa striate, faintly puberulous. Hook. f. Fl. Br. Ind. III. 653; Kurz For. Fl. II. 194. *Echites religiosa*, Teysm. & Binnend. Hort. Bogor. 126.

SIAMESE STATES: at Kasoom, Curtis 3241. MALACCA: *Maingay* (K.D.) 1071. SINGAPORE: *T. Anderson* 115; *Maingay* (K.D.) 3334; cultivated only.—DISTRIB. Siam (*Schomburgk* 132); Tenasserim.

#### Subtribe 2.—NERINE.

#### 19. STROPHANTHUS, DC.

Small trees or shrubs; often climbing. *Leaves* opposite, pinniveined. *Flowers* usually large, in terminal cymes. *Calyx* 5-partite, scales 5 to many within at the base of the lobes. *Corolla* funnel-shaped; tube short, campanulate or urceolate at the mouth and furnished with 10 free or connate corona-scales\*; lobes 5, twisted, overlapping to the right, sometimes produced in long or short tails, rarely ovate-acute. *Stamens* inserted at the top of the tube, included; filaments short;

\* The corona-scales may be either considered as 10, free or connate; or as 5, often cleft to the base.

anthers sagittate, more or less acuminate or produced in a long bristle, connivent around the stigma and adhering to it; cells pollen-bearing near the top only, produced at the base in empty spurs. *Disk* none. *Carpels* 2, distinct; style slender; stigma thick, columnar or conical with a membranous reflexed frill at the base, tip simple or bifid; ovules many in each carpel, many-seriate. *Fruit* of two follicular mericarps, oblong or elongate, hard, divergent or divaricate. *Seeds* compressed, fusiform, narrowed into a long, feathery-plumose point, base with a deciduous coma; albumen scanty, fleshy; cotyledons oblong, plano-convex. — **DISTRIB.** Tropical and South Africa and Tropical Asia; about 40 species.

Lobes of the corolla exceeding the tube in length:—

Lobes of the corolla more than 1 in. long; main nerves of leaves conspicuous; corona-scales falcate-acuminate:—

Leaves 3 to 5 in. long; calyx-lobes acuminate from an ovate base, .25 in. long; bracts short .. .. 1. *S. dichotomus*.

Leaves 1.5 to 3 in. long; calyx-lobes subulate-lanceolate, .5 in. long; bracts long, similar to calyx-lobes .. 2. *S. Wallichii*.

Lobes of the corolla scarcely .75 in. long, blunt at tip; main nerves very obscure; corona-scales a short crenate fold .. 3. *S. perakensis*.

Lobes of the corolla almost as long as the tube; leaves 2 to 4 in. long; main nerves conspicuous; corona-scales linear-falcate; calyx-lobes ovate-acute, .1 in. long. .. 4. *S. singaporianus*.

1. **STROPHANTHUS DICHOTOMUS**, DC. in Bull. Soc. Philom. Paris III. 123 (1802). An erect or straggling sarmentose shrub, 9 to 10 ft. high; branches stout, as are the branchlets; bark of branchlets dark brown with prominent lenticels. *Leaves* chartaceous, often membranous when dry, elliptic, elliptic-oblong or -obovate, more or less abruptly shortly acuminate at apex, cuneate at base; both surfaces glabrous; margins recurved; 3 to 5 in. long, 2 to 3 in. broad; midrib prominent, impressed above, raised beneath; main nerves 8 to 9 pairs, impressed above, raised beneath, starting at an angle of about 70° with the midrib and slightly curved upwards to meet in a prominent intramarginal looped nerve at a little distance from the edge; secondary nerves few, between the main nerves; reticulations oblique, impressed above; petiole .25 in. long, articulate. *Cymes* dichotomous; peduncle short, stout, up to .5 in. long; branches short, corymbose, with ovate-acuminate, caducous bracts about .15 in. long; pedicels stout, .3 to .5 in. long; bracts small, ovate-acute; flowers whitish or greenish with dark purple corolla-tails. *Calyx* with very short tube; lobes glabrous, acuminate from an ovate base, .25 in. long, furnished within at the base with a pair of ovate-acute, entire or bifid scales. *Corolla*-tube slightly cylindric at first, then funnel-shaped, .75 in. long; lobes rounded at first, .5 in.



long, ending in very long, up to 4 in. or more, slender tails; corolla-scales alternate with the lobes, cleft nearly to the base, divisions linear-falcate on a broad base .2 to .25 in. long. *Anthers* pubescent on the back; tips produced in a very long, slender bristle; filaments broad, decurrent within the tube. *Ovary* glabrous; style stout, upper part rugose; stigma with a reflexed fringe. *Follicles* very large, divergent, about 8 in. long by 2 in. broad, broadest at the base where united, tapering to a broad rounded point. *Seeds* compressed, fusiform, .7 in. long, produced in a long beak, the upper part of which, about 1 in. long, is furnished with a brush-like coma of white silky hairs, 1 in. long or more; testa thin, dark brown; albumen very thin; cotyledons oblong, somewhat auricled at base, .4 in. long, 15 in. broad; radicle cylindric, .25 in. long. A. DC. Prodr. VIII. 417; Bl. Bijdr. 1044; Miq. Fl. Ind. Bat. II. 441; Hook. f. Fl. Br. Ind. III. 655. *S. Horsfieldianus*, Miq. l.c. 442. *S. scandens*, Roem. & Sch. Syst. IV. 412. *S. longicaudatus* and *S. Griffithii*, Wight Ic. t. 1299, 1300; Miq. l.c. 442. *S. caudatus*, Kurz in Journ. As. Soc. Beng. XLVI. 257 and For. Fl. II. 191; Pax in Engl. Bot. Jahrb. XV. 263; Franchet in Nouv. Arch. Mus. Paris, 3<sup>e</sup> sér. V. 263; Gilg in Engl. Monog. 16. *S. pentaphyllus*, Griff. Notul. IV. 78. *Echites caudata*, Burm. Fl. Ind. 68, t. 26. *Nerium caudatum*, Lamk. Diet. III. 458.

PERAK: Wray 1668, 3306; *Scortechini* 1819, 1740; *King's Collector* 3896, 8628. MALACCA: *Griffith*; *Maingay* (K.D.) 1073; *Lobb*.—DISTRIB. Tenasserim, Java.

2. STROPHANTHUS WALLICHII, A. DC. Prodr. VIII. 418 (1844). A climbing glabrous shrub; branchlets slender, terete, bark brown with many prominent lenticels. *Leaves* membranous; elliptic-oblong or -obovate, abruptly and shortly acuminate at apex, cuneate to almost rounded at base, plicately folded when young; upper surface dull, dark, lower surface pale; margins undulate, recurved; 1.5 to 3 in. long, .75 to 1.25 in. broad; midrib prominent, flattened beneath, slightly impressed above; main nerves 7 to 8 pairs, at an angle of about 60° with the midrib, curving upwards to join in an intramarginal looped nerve well within the margin; secondary nerves and reticulations in an elegant network; all, with the main nerves and midrib, prominent on the under surface by their colour darker than that of the tissue; petiole slender, .25 in. long. *Cymes* dichotomous, spreading, reaching 3 in. long and 3 in. in breadth at the corymbose top; main peduncles 1 to 1.5 in. long; secondary peduncles about 4, up to 1 in. long; tertiary peduncles and pedicels slender, about .25 in. long; bracts or bracteoles at each joint in pairs similar to the calyx-lobes, linear-lanceolate, recurved, .25 to .35 in. long, minutely pubescent; flower-buds slender; flowers pink or yellow with

faint reddish stripes. *Calyx*-lobes subulate-lanceolate, .5 in. long, reflexed in flower, minutely pubescent; scales at base very minute, often wanting. *Corolla*-tube cylindric-funnel-shaped, as long as the calyx-lobes; lobes ovate acuminate, produced into slender tails reaching 2 to 3 in. long; corona-scales cleft to the base, each half falcate acuminate, about .15 to .2 in. long. *Anthers* very narrow, produced in long slender soft awns up to .5 in. long, the awns twisted together in the flower, connective on the back and lower part of awns minutely pubescent; filaments broad, decurrent half-way down the tube. *Ovary* glabrous, depressed; style slender, slightly pubescent. *Fruit* not known. Pax in Engl. Bot. Jahrb. XV. 378; Franchet in Nouv. Arch. Mus. Paris, 3<sup>e</sup> sér. V. 268; Gilg in Engl. Monog. 16; Hook. f. Fl. Br. Ind. III. 655; Miq. Fl. Ind. Bat. II. 442; Prain Beng. Plants 677. *S. dichotomus*, Wall. Cat. 1641; Wight Ic. t. 599; Lodd. Bot. Cab. t. 759; Grah. in Maund Bot. III. t. 150. *S. caudatus*, Kurz For. Fl. II. 193. *Nerium caudatum*, Roxb. Fl. Ind. II. 9; Burm. Fl. Ind. t. 26.

JUNKSEYLOON ISLAND (Tongka): Curtis 2931. TRANG: King's Collector 1387 or 1397 (?).—DISTRIB. India (Circars, Khasia Hills, Chittagong and Tenasserim).

3. STROPHANTHUS PERAKENSIS, Scortechini MS. in Herb. Calc. A slender climber; branchlets slender, glabrous, lenticellate. *Leaves* thinly coriaceous when green, membranous when dry, glabrous; elliptic-oblong, acuminate at apex, acute at base; both surfaces somewhat pale, the lower paler; margins crispate, slightly recurved; 2 to 3.5 in. long, .75 to 1 in. broad; midrib thick, impressed above, prominently raised beneath; main nerves very obscure, 10 to 12 pairs, leaving the midrib at an angle of about 70° and nearly straight, joining near the margin in a very faint intramarginal looped nerve; reticulations not visible; petiole .25 in. long, channelled above and bordered by the decurrent margins of the blade. *Cymes* slender, few-flowered, about 1 in. long and 1 in. in diam., trichotomous; peduncle .25 to .5 in. long; secondary peduncles rather shorter, bearing 3 terminal flowers; pedicels slender, pubescent, about .1 in. long; bracts and bracteoles in pairs at all nodes, ovate and dark red at base, long acuminate, .15 to .2 in. long; buds slender, fusiform; flowers yellowish-green. *Calyx*-lobes ovate-lanceolate, acuminate, .2 in. long, the three inner with two minute obtuse scales at the base within. *Corolla*-tube urceolate, constricted at the mouth, as long as the calyx-lobes; lobes ovate-cordate at base, long acuminate with a blunt tip, .5 to .7 in. long; corona-scales cleft to the base, scarcely more than a short crenate fold. *Stamens* included; filaments short, decurrent half-way to the base of the tube and ending in an obtuse spur; anthers sagittate, the connective produced in a soft pubescent tip as long as the

anthers, pubescent on the back. *Ovary* ovoid, glabrous; style thick, rough; stigma cylindric with a short fringe below and a point at the apex. *Fruit* not seen.

PERAK: at Dipong, *Scortechini* 1818.

4. *STROPHANTHUS SINGAPORIANUS*, Gilg in Engl. Monog. 11 (1903). A straggling shrub; branchlets slender, brown, thickly covered with white lenticels. *Leaves* elliptic or elliptic-oblong, abruptly and shortly acuminate at apex, acute at base; dull on the upper surface and dark brown when dry, paler on the lower; margins crispately undulate, recurved; 2 to 4 in. long, 1.5 to 2 in. broad; midrib stout, impressed above, prominently raised beneath; main nerves 6 to 8 pairs, starting at an angle of about 70° and curving upwards to meet in an intramarginal deeply looped nerve; secondary nerves and reticulations well-marked beneath; petiole .25 to 4 in. long, bordered by the decurrent margins of the blade. *Cymes* dichotomous on a peduncle .25 to 1 in. long, reaching 2 in. in length and about 2 in. broad at the corymbose top; branch peduncles and pedicels rather stout, of varying length, pedicels greatly enlarged in fruit; bracts and bracteoles in pairs at all nodes, ovate-acute, about .15 in. long; buds clavate, flowers purple. *Calyx*-lobes ovate-acute, glabrous, .1 in. long, inner three furnished with 2 to 4 small glands at the base inside. *Corolla*-tube cylindric, sometimes a little constricted at the mouth, .25 in. long; lobes as long as tube, ovate-acute, campanulate; corona-scales linear-falcate, cleft to the base, .1 in. long. *Anthers* produced in slender soft filiform awns; filaments pubescent, flattened, decurrent about half-way down the corolla-tube. *Ovary* ovoid, glabrous; style pubescent. *Follicles* 8 in. long by .5 to .75 in. broad, base broad, middle slightly turgid, then tapering to a long hard curved point; divergent so as to lie in the same straight line; pericarp terete, smooth. *Seeds* oblong-lanceolate, .75 to 1 in. long, .1 in. broad, pointed above, produced below in a long feathery plumose point; the coma white, soft; testa pale-brown, puberulous. *S. brevicardatus*, Wight Ic. t. 1302 (1850); Hook. f. Fl. Br. Ind. III. 656; Kurz For. Fl. III. 191 and Journ. As. Soc. Beng. XLVI. ii. 257; Pax in Engl. Bot. Jahrb. XV. 380; Franchet in Nouv. Arch. Mus. Paris, 3<sup>e</sup> sér. V. 259. *Cercocoma singaporiensis*, Wall. Cat. 1623; G. Don Gen. Hist. Dichl. Pl. IV. 83; A. DC. Prodr. VIII. 432; Miq. Fl. Ind. Bat. II. 445.

MALACCA: *Griffith*; *Maingay* (K.D.) 1072; *Derry* 528. SINGAPORE: *Wallich* 1623; *Lobb*; *Kurz*; *Ridley* 6040, 9149; *King's Collector* 1191.—  
DISTRIB. Mergui (?), Borneo (*Haviland* 1770, *Beccari* 797; *Motley*).

## Subtribe 3.—ECHITIDINÆ.

## 20. URCEOLA, Roxb.

Large climbing shrubs. *Leaves* opposite, penninerved. *Flowers* small, in dense corymbosely paniced cymes at the ends of the branchlets. *Calyx* 5-partite, without glands within; lobes oblong or linear. *Corolla* urceolate or subglobose; throat naked; lobes 5, short, valvate, subinduplicate. *Stamens* attached to the base of the corolla, included; filaments very short; anthers sagittate, scarcely acuminate, connivent around the stigma and adhering to it at their middle; cells produced at the base in empty spurs. *Disk* cupular or annular, truncate or shortly 5-lobed. *Ovary* of 2 distinct carpels, longer than the disk, many-ovuled; style short; stigma oblong-conic, subannulate at the base. *Fruit* of 2 spreading follicular mericarps, thick and acuminate or elongate, contracted or not between the seeds. *Seeds* oblong or linear, compressed, villous; tip contracted, bearded with long persistent brown hairs and crowned with a long white deciduous coma; albumen scanty; cotyledons flat, foliaceous; radicle short.—DISTRIB. Malay Peninsula and Archipelago; about 7 to 8 species.

Follicles straight, even, terete, slender, not constricted between the seeds:—

Follicles in one line or very slightly curved either way:—

Leaves rusty-pubescent beneath; calyx-lobes linear, .1 to .15 in. long, much recurved .. .. 1. *U. elastica*.

Leaves nearly or quite glabrous beneath:—

Leaves somewhat glaucous beneath; calyx-lobes broad obtuse, little recurved; corolla urceolate .. .. 2. *U. Maingayi*.

Leaves reddish-brown beneath; calyx-lobes ovate, very small, under .05 in. long; corolla globose .. .. 3. *U. brachysepala*.

Follicles recurved; leaves red-brown beneath when dry; calyx-lobes longer than corolla .. .. 4. *U. malaccensis*.

Follicles poniard-shaped, thickened in the lower part, long-pointed above; calyx-lobes very short; leaves red-brown when dry .. .. 5. *U. lucida*.

Follicles torulose, thickened opposite the seeds and constricted between them; leaves red-brown when dry .. .. 6. *U. torulosa*.

SPECIES IMPERFECTLY KNOWN: 7. *U. reticulata*. 8. *U. sp.*

1. URCEOLA ELASTICA, Roxb. in As. Res. V. 167 (1799) *with fig. (excl. fruit)*. A large climbing shrub; branches thick, with dark brown bark; branchlets slender, often flexuose, innovations pubescent. *Leaves* coriaceous, ovate or elliptic-ovate, abruptly acuminate at apex, rounded at base; upper surface glabrous except on the midrib and main nerves, lower rusty-pubescent, but reddish brown when dry; margin strongly



recurved, often with thicker pubescence beneath; 4 to 7 in. long, 2 to 3·5 in. broad; midrib stout, slightly impressed above; main nerves 10 to 12 pairs, strongly marked beneath, slightly impressed above, at an angle of about 60° with the midrib, straight at first and then curving and anastomosing near the margin; secondary nerves none; reticulations transverse, fairly regular; petiole ·5 to 1 in. long, rusty-pubescent, twisted at the base, the bases of each pair joined by a ridge at the node. *Inflorescence* finely rusty-pubescent, trichotomous, up to 12 in. long and 8 in. broad; main branch peduncles 2 to 2·5 in. long; secondary branch peduncles 1 to 1·5 in. long; cymules terminal, corymbose or subumbellate, many- and densely-flowered, ·05 to ·1 in. long; bracts leaf-like; bracteoles linear-subulate, ·1 to ·25 in. long; flowers very small. *Calyx*-tube short; lobes linear, ·1 to ·15 in. long, recurved. *Corolla* urceolate, tube ·05 in. long, glabrous within, except a tuft of reflexed hairs between the stamens; lobes oblong, a little longer than the tube. *Anthers* acuminate, pollen-cells at the top; filaments broad, short, minutely pubescent. *Ovary* globose, pubescent; style short; stigma conical. *Follicles* connected at the base, straight, horizontal or sometimes recurved, cylindric, acuminate, brown-velvety-pubescent when young, smooth and glabrous when old, about 6 in. long and ·3 in. broad. *Seeds* linear-oblong, ·5 in. long, flattened, surmounted by a ring of tawny bristles, from the centre of which arises a coma of white silky hairs 1·5 to 2 in. long; testa slightly tawny-villous; albumen very scanty; cotyledons oblong; radicle rather long. A. DC. Prod. VIII. 358; Wight Ic. t. 473 (*excl. figure and description of fruit*); Miq. Fl. Ind. Bat. II. 416; Hook f. Fl. Br. Ind. III. 656. *Tabernaemontana elastica*, Spreng. Syst. Veg. i. 639. ? *Vahea gummifera*, Poir Dict. Suppl. V. 409.

PENANG: Roxburgh (*Howison* and C. Campbell); Curtis 823; King's Collector 1749. PERAK: Wray 595, 1812, 2308, 2599, 4273; King's Collector 2241, 2447, 3597, 4239, 4886, 5061, 7567, 10348. SELANGOR: Goodenough 10600. MALACCA: Griffith; Maingay (K.D.) 1053, 1091; Cantley; Derry 404, 1024, 1031; Curtis 3477.—DISTRIB. Sumatra.

As noted by Hook. f. in Fl. Br. Ind., the fruit figured and described by Roxburgh, Wight, and A. DC. as that of *U. elastica* is that of *Orchipeda fatida*, Blume, a Javanese tree.

2. URCEOLA MAINGAYI, Hook. f. in Fl. Br. Ind. III. 658 (1882). A large climbing shrub; branchlets nearly black, terete, more or less rusty-pubescent as are the innovations. *Leaves* coriaceous; elliptic, abruptly acuminate at apex, narrowed or rounded at base; glabrous and shining greenish brown on the upper surface, pale and dull and more or less glaucous on the lower, glabrous or minutely pubescent; margins recurved, 2·5 to 5·5 in. long, 1·5 to 3 in. broad; midrib prominent,

dark, impressed on the upper surface; main nerves 8 to 10 pairs, prominent, starting at an angle of about  $70^{\circ}$  with the midrib and curving upward to anastomose near the margin; secondary nerves few, reticulations transverse, prominent, more or less raised above; petiole  $\cdot 4$  to  $\cdot 6$  in. long. *Inflorescence* minutely rusty-pubescent, trichotomous, up to 8 in. long and 5 in. broad; main branch peduncles 2 to  $2\cdot 5$  in. long; secondary rather shorter; cymules terminal, corymbose or subumbellate; pedicels slender,  $\cdot 1$  in. long; lower bracts leaf-like; bracteoles linear-subulate,  $\cdot 2$  in. long; flowers very small. *Calyx*-tube very short; lobes ovate oblong, little recurved, obtuse at tip,  $\cdot 125$  in. long. *Corolla* urceolate; tube very short, glabrous within; lobes oblong, rather longer than the tube. *Anthers* sagittate, obtuse at apex, the tails diverging. *Ovary* globose, pubescent; style obconical; stigma conical with a short bifid apiculus. *Follicles* connected at the base, diverging nearly horizontally, 6 to 8 in. long,  $\cdot 25$  in. broad, usually hooked at the tip; pericarp terete, dark brown, glabrous. *Seeds* linear-oblong, flattened,  $\cdot 6$  in. long, surmounted by a ring of tawny bristles and a coma of white silky hairs 1 in. long; testa softly tawny-villous; albumen very scanty; cotyledons oblong; radicle rather long.

PERAK: *King's Collector* 4743, 5134; *Wray* 2367 (young follicles curving inwards almost to a circle). MALACCA: *Hullett*. SINGAPORE: *Mainingay* (K.D.) 1083; *Ridley* 2717.—DISTRIB. Borneo (*Haviland* 1527, 1767, 3497).

3. URCEOLA BRACHYSEPALA, Hook. f. in Fl. Br. Ind. III., 659 (1882). A climbing shrub; branchlets slender, dark brown, terete. *Leaves* chartaceous, perhaps coriaceous when green; elliptic, abruptly obtusely acuminate at apex, rounded at base; both surfaces smooth, red-brown when dry; margins slightly recurved; 4 to  $5\cdot 5$  in. long,  $1\cdot 5$  to  $2\cdot 5$  in. broad; midrib prominent, rather slender; main nerves 6 to 8 pairs, starting from the midrib at an angle of  $70^{\circ}$  to  $75^{\circ}$  and curved upwards to and along the margin only, the upper few meeting in an intra-marginal nerve, rest anastomosing, all prominent, raised on the upper surface as are the prominent transverse reticulations; petiole slender,  $\cdot 5$  to 1 in. long, articulate near the base. *Inflorescence* puberulous, trichotomous, terminal on main or side branchlets, up to about 6 in. long and 5 in. broad; main peduncle 1 to 2 in. long, terete; secondary peduncle also about 1 to 2 in. long, flattened as are further branches; cymules corymbose, pedicels slender, often recurved; bracts leafy; bracteoles subulate, reddish, numerous; buds globose; flowers minute. *Calyx*-lobes very small, ovate,  $\cdot 03$  to  $\cdot 04$  in. long, very slightly puberulous. *Corolla* globose, villous without, glabrous within, except for tufts of hair between the stamens, inflated,  $\cdot 075$  to  $\cdot 1$  in. long; lobes induplicate.

*Anthers* acute or very minutely apiculate; spurs slightly incurved. *Ovary* villous; style obconical; stigma conical, annulate at base. *Follicles* usually horizontal, in one line, sometimes slightly curved backwards, terete, 6 to 8 in. long, .2 in. broad, acuminate and slightly hooked at apex. *Seeds* flattened, .4 to .5 in. long, ending in a tuft of bristles and a milky-white coma about 1.5 in. long; testa tough, densely rusty-villous.

PENANG: *Curtis* 403. PERAK: *Scortechini*. MALACCA: *Maingay* (K.D.) 1079, 1080; *Curtis* 3478; *Goodenough* 1564; *Ridley* 1610, 2727, 6937, 8397, 9125, 10772.

4. URCEOLA MALACCENSIS, Hook. f. in Fl. Br. Ind. III. 658 (1882). A large climbing shrub, glabrous except the innovations and the inflorescence; branchlets nearly black, terete, rather slender. *Leaves* coriaceous ovate or ovate-oblong, obtusely caudate-acuminate at apex, rounded at base; upper surface pale green, pale when dry, lower red-brown when dry, both surfaces smooth; margins slightly recurved; 2 to 4.5 in. long, 1 to 2 in. broad; midrib strong, impressed above, raised beneath; main nerves 6 to 8 pairs, slender, prominently marked on both surfaces, starting at an angle of about 60° with the midrib and curved upwards to and along the margin, intramarginal nerve only near the tip; reticulations transverse, regular; petiole .5 to .75 in. long, slender, articulate near the base, the bases of each pair of leaves joined by a slender ridge at the node. *Inflorescence* of terminal or axillary cymes, hoary-pubescent, trichotomous, about 2 in. long and 3 in. broad; cymules many-flowered, congested, corymbose; peduncles about 1 to 1.25 in. long, flattened; secondary peduncles about 1 in. long, rest smaller; bracts leafy; bracteoles very many, linear-oblong, similar to the calyx-lobes; buds globose. *Calyx*-lobes linear-oblong or almost spatulate, unequal, recurved, up to .1 in. long. *Corolla*-tube very short; lobes oblong, induplicate, glabrous within except for a small tuft of hair between the stamens. *Anthers* obtuse, with a rounded apiculus; spurs straight. *Ovary*-carpels hirsute; style obconic; stigma conical, tip bifid. *Follicles* slender, terete, acuminate, 8 to 9 in. long, .2 in. broad, slightly curved, recurved so that the angle between them is about 240°. *Seeds* oblong-fusiform; acuminate at the base, the tip furnished with a ring of bristles enclosing the white, silky, about 2 in. long, coma; testa thin, villous, with golden-silky stiff hairs.

PERAK: *King's Collector* 4464; *Ridley* 9666. MALACCA: *Maingay* (K.D.) 1098, 1082, *part.* SELANGOR: *Curtis* 2395. JOHORE: *Ridley* 9158; *G. King*. SINGAPORE: *Hullett* 846, 909; *Cantley* 121.

5. URCEOLA LUCIDA, Benth. in Gen. Pl. ii., 716 (1876). A climbing shrub, glabrous except the inflorescence; branchlets slender, nearly black, terete. *Leaves* chartaceous; elliptic or elliptic-oblong, abruptly



acuminate at apex with a usually oblique acumen, rounded at base, shining on both surfaces, red-brown when dry; margins slightly recurved; 3 to 5 in. long, 1.25 to 2 in. broad; midrib strong, very prominent beneath, slightly impressed above; main nerves 8 to 12 pairs, slightly impressed above, very strong beneath, starting at an angle of nearly 60° with the midrib and curved upwards to and along the margin, where they meet to form almost an intramarginal looped nerve; reticulations transverse, regular; petiole slender, .5 to 1 in. long, often twisted. *Inflorescence* of large terminal and axillary trichotomous panicles of cymes, reaching in all 1 ft. in length and breadth; peduncles and branches slender, uppermost only pubescent; main peduncles 2 to 3 in. long, secondary 1 to 1.5 in. long, tertiary about .5 in. long; cymules corymbose; pedicels short; bracteoles ovate acuminate, very small; buds globose or ovoid. *Calyx*-tube short; lobes broadly oblong, recurved, .05 in. long. *Corolla* urceolate, .1 in. long, tube very short; lobes oblong, longer than the tube, pubescent without, glabrous within. *Anthers* obtuse at the apex. *Ovary* glabrous or slightly hairy at the tip; style short; stigma conical. *Follicles* 3 to 4 in. long, horizontal, rigid (like poniards), base contracted, tip acuminate, .4 to .5 in. broad at the broadest a little above the base; exocarp thick; endocarp crustaceous; placenta woody. *Seeds* linear-oblong, .3 to .5 in. long, flattened, ending in a tuft of tawny bristles, which encloses a white silky spreading coma about 1 in. long; testa crustaceous, rusty-silky-pubescent; cotyledons foliaceous, .3 in. long; radicle .25 in. long. Hook. f. Fl. Br. Ind. III. 658. *Chavannesia lucida*, A. DC. Prod. VIII. 444. *Echites ? lucida*, Wall. Cat. 1670; G. Don Gen Hist. Dichl. Pl. IV. 75.

PENANG: Wallich 1670; Curtis 661, 941, 3569; King's Collector 1329. PERAK: Scortechini 17, King's Collector 4929. MALACCA: Derry 333, 978, 1158, 1169. SINGAPORE: Hullett 860; Ridley 2745, 5628, 6937.

6. URCEOLA TORULOSA, Hook. f. in Fl. Br. Ind. III. 659 (1882). A climbing shrub, glabrous except the inflorescence; branchlets rather slender, very dark brown, terete. *Leaves* thinly coriaceous; ovate-oblong or oblong-lanceolate, acuminate at apex, acute or rounded at base, smooth on both surfaces, red-brown when dry; margin slightly recurved; variable in size, usually 4 to 7 in. long, 1.5 to 2 in. broad, but on end branchlets sometimes as small as 1 to 1.5 in. long and .75 to 1 in. broad; midrib slender, impressed above; main nerves very slender, 6 to 10 pairs, at about 50° to 60° with the midrib, curved upwards to and along the margin, where they anastomose; reticulations transverse, not prominent; petiole about .5 in. long, articulate near the base. *Cymes* terminal on side branchlets as well as on main branchlets, 2 to 2.5 in. long, 2 in. broad, pubescent; peduncles 1 to 2 in. long; branch peduncles short;



pedicels slender; bracteoles linear-subulate or lanceolate; buds globose; flowers very small. *Calyx*-lobes ovate-oblong, .05 to .075 in. long, obtuse, erect. *Corolla* urceolate; tube very short; lobes oblong acute, slightly longer than calyx-lobes, glabrous within except for tufts of hair between the anthers. *Anthers* .075 in. long, tip acute or bifid, spurs short, straight. *Ovary* villous; style obconic, subannulate at the base; stigma conical. *Follicles* torulose, very slender, 1.5 to 2.5 ft. long, smooth, the swellings 1 to 1.5 in. apart; pericarp thin, smooth inside; placenta enlarged opposite the seeds. *Seeds* elliptic-lanceolate, .5 in. long, the top crowned with a dense tuft of tawny bristles, within which arises the white silky coma 1 to 1.8 in. long; testa rather thick, ribbed, densely villous, with tawny hairs.

MALACCA: *Griffith*; *Maingay* (K.D.) 1080, 1086; *Derry* 1096. JOHORE: *Ridley* 11132. SINGAPORE: *Ridley* 152, 2722, 3602, 4433, 4960, 6523; ? *Kunstler* 198; *Hullett* 509.

#### DOUBTFUL SPECIES.

7. URCEOLA RETICULATA, King & Gamble, n. sp. A climbing shrub; branchlets nearly black, smooth, slightly angled; all parts glabrous except the inflorescence and extreme innovations. *Leaves* elliptic; abruptly caudate-acuminate at apex, rounded or slightly cordate at base, shining on the upper surface, often plicate; margin recurved; 3.5 to 6 in. long, 2 to 3 in. broad; midrib strong, prominent beneath, slightly impressed above; main nerves 10 to 12 pairs, impressed above, prominent beneath, at an angle of 70° with the midrib, at first straight, then curved to meet in a conspicuously looped intramarginal nerve; secondary nerves few, short; reticulations transverse, very prominent, especially beneath; petiole .5 to nearly 1 in. long, slender, articulate near the base. *Inflorescence* terminal or axillary, tawny-puberulous, trichotomous, very much 5- to 6-pinnately paniculate, reaching 12 in. in length and nearly the same in breadth, but in some cases and especially when axillary very much smaller; peduncles and their branches variable in length, but always long, slender, flattened; ultimate cymules, subumbellately corymbose; bracts leafy, gradually diminishing; bracteoles small, ovate-lanceolate to ovate; buds globose, minute. *Calyx*-tube short; lobes as long as tube, .03 in. long, ovate, acute. *Corolla* globose; tube scarcely any; lobes ovate .06 in. long, glabrous within except for the tufts of hair between the stamens. *Anthers* sagittate; tip flattened, membranous; spurs as long as the upper part; filaments very short. *Ovary* villous, style obconical; stigma conical, bilobed. *Fruit* not known.

MALACCA: *Pun Bebas* 122. SINGAPORE: *Ridley* 2745, 5628.

8. URCEOLA ? branches and leaves glabrous; bark black when dry;

leaves 2 to 2·5 in. long by ·75 to 1·25 in. broad, elliptic- or ovate-lanceolate, obtusely acuminate, narrowed into the petiole, firmly coriaceous; pale brown, shining above; nerves 3 to 4 pairs, very slender, ascending; follicles horizontal, 6 to 8 in. long by ·25 in. broad, slightly curved, cylindric from the base, narrowed at the apex, hard; seeds ·3 to ·35 in. long, very slender, narrowed into a filiform process longer than the body, on which the fine pale brown hairs of the coma are placed. Hook f. Fl. Br. Ind. III. 659.

MALACCA: *Maingay* (K.D.) 1069.

We can do nothing to throw any further light on this remarkable plant. The structure of the seeds resembles that of those of *Kickxia*, but otherwise the plant is quite unlike that genus.

## 21. PARAMERIA, Benth.

Large climbing shrubs. *Leaves* opposite, rarely 3-nately whorled. *Flowers* small, in broad lax terminal or axillary panicles. *Calyx* small, 5-fid or 5-partite, with many glands at the base within. *Corolla* hypocrateriform or subcampanulate; tube short, broad at the mouth, naked; lobes 5, oblique, twisted, overlapping to the left. *Stamens* inserted at the base of the corolla, included; filaments short; anthers lanceolate-sagittate, acute or apiculate, conniving over and adhering to the stigma; cells spurred at the base. *Disk* of 5 connate scales. *Ovary* of 2 distinct carpels, longer than the disk, many-ovuled; style short, top obconical; stigma conical, with a minute nearly entire apiculus. *Fruit* of 2 long, slender, distantly torulose, follicular mericarps. *Seeds* linear or oblong, compressed, slightly or not contracted at the apex, crowned with short persistent bristles and a long deciduous coma; testa hairy; albumen scanty; cotyledons oblong, leafy; radicle short or long. — **DISTRIB.** India and Malaya, about 4 to 5 species.

Leaves under 6 in. long; inflorescence in loose paniculate cymes.

Leaves few- (5 to 7 pairs) nerved; inflorescence nearly glabrous; follicles 6 to 12 in. long; swellings opposite the seeds short; seeds under ·5 in. long, pubescent . . . . . 1. *P. glandulifera*.

Leaves many- (8 to 10 pairs) nerved; inflorescence very tawny-pubescent; follicles 20 to 24 in. long; swellings opposite the seeds elongate; seeds 1 in. long, glabrous or slightly pubescent . . . . . 2. *P. polyneura*.

Leaves over 6 in. long; inflorescence in dense paniculate cymes; follicles 11 to 14 in. long; swellings opposite the seeds short; seeds ·4 in. long, glabrous . . . . . 3. *P. densiflora*.

1. **PARAMERIA GLANDULIFERA**, Benth. in Gen. Pl. II. 715 (1876). A large climbing shrub; branchlets stout or slender, brown, smooth. *Leaves* chartaceous, opposite or sometimes 3-nately whorled, elliptic, oblong or obovate, abruptly acuminate at apex, widely cuneate at base;

glabrous and shining on the upper surface, somewhat paler on the lower, glabrous except for tufts in the axils of the main nerves, not always found; margins slightly recurved; 3 to 5 in. long, 1·5 to 2 in. broad; midrib slender, impressed above, raised beneath; main nerves 5 to 7 pairs, arched upwards to and along the margin, where they anastomose, rather indistinct, as are the secondary nerves and reticulations; petiole short, ·1 to ·2 in. long, stout. *Cyme*-panicles terminal or axillary to the upper leaves, trichotomous, glabrous or slightly puberulous; branches spreading, slender; terminal cymules subumbellately corymbose; bracts leafy; bracteoles very small, ovate-acute; buds oblong, clavate; flowers white, fragrant. *Calyx*-lobes ovate, ciliate, puberulous outside, ·05 in. long, with minute, inconspicuous, subulate glands at the base inside. *Corolla* campanulate; tube ·125 in. long, puberulous without; lobes rather longer than the tube, rotate, twisted to the right, obtuse. *Anthers* very small, apiculate, the spurs long; filaments short, with a broad base. *Ovary* minutely hairy; style obconical. *Follicles* very slender, flexuous, 6 to 12 in. long, glabrous, acuminate, diverging at up to 60° and then curving to run parallel to each other; swellings from ·75 to 1·25 in. apart, short; pericarp thin, smooth; placenta enlarged opposite the seeds. *Seeds* oblong, concave on the ventral surface, ·4 to ·5 in. long, ending in a tuft of brown bristles, and a silky coma about 1 in. long; testa pubescent, thin; albumen scanty; cotyledons ovate, ·15 in. long, very thin, foliaceous; radicle ·125 in. long, slender, cylindric. Kurz in Journ. As. Soc. Beng. XLVI. ii. 255 and For. Fl. II. 660; Hook. f. Fl. Br. Ind. III. 660. *Ecdysanthera glandulifera*, A. DC. Prodr. VIII. 443; Wight Ic. t. 1307 (*E. Griffithii* in text); Miq. Fl. Ind. Bat. II. 432. *E. barbata*, Miq. l.c. 431. *Echites ? glandulifera* and *monilifera*, Wall. Cat. 1659, 1660; G. Don Gen. Hist. Dichl. Pl. IV. 75. *Parsonsia barbata*, Bl. Bijl. 1042.

PENANG: Curtis 1142. MALACCA: Griffith; Maingay (K.D.) 1077, 1093; Cantley; Derry 920, 943. SINGAPORE: Wallich 1660; Lobb.—DISTRIB. Burma, Andaman Islands, Java, Borneo (Haviland 1993, 2056, &c.; Motley 776), Philippines, Cambodia.

2. PARAMERIA POLYNEURA, Hook. f. in Fl. Br. Ind. III. 660 (1882). A slender climbing shrub, glabrous except the inflorescence and innovations; branches stout, with dark-brown, rough, lenticellate, horizontally ridged bark; branchlets slender, minutely tawny puberulous. *Leaves* membranous; elliptic or elliptic-oblong or -obovate, abruptly short-acuminate at apex, narrowed and at length rounded at base; dark brown and shining above, paler beneath, and very red-brown and reticulate when dry, punctulate; margins slightly recurved; 3 to 6 in. long, 1·25 to 2·5 in. broad; midrib prominent on the lower, impressed



on the upper surface; main nerves 8 to 10 pairs, the lowest pair very near the edge, starting at an angle of about  $65^\circ$  with the midrib, curving upwards to and along the margin, where they anastomose, raised beneath, as are the numerous secondary nerves and the prominent transverse reticulations; main nerves usually with a tuft of hair in their axils; petiole .1 to .2 in. long, articulate near the base. *Inflorescence* paniculate, terminal, sessile, trichotomous, 4- to 5-pinnate, tawny-puberulous, usually about 6 in. long and 6 to 8 in. broad; primary branches 1.5 to 2.5 in. long, flattened; subsequent branches gradually shorter; pedicels short, .1 in. long, slender; cymules corymbose; bracts leafy; bracteoles very minute, ovate; buds shortly clavate; flowers white, with a pink throat. *Calyx*-tube short; lobes ovate, acute, ciliate, about .04 in. long; glandular scales minute, generally subulate. *Corolla*-tube campanulate, contracted at the base, .1 in. long, glabrous within, sparsely pubescent without; lobes ovate-oblique, twisted to the right, rotate in flower, as long as tube. *Anthers* very small, with a triangular membranous tip. *Disk* faintly 5-lobed. *Ovary* villous; style obconical; stigma conoidal. *Follicles* slender, straight, 20 to 24 in. long, glabrous, acuminate, diverging at  $60^\circ$  to  $90^\circ$  and then slightly curving to lie parallel; the swellings opposite the seeds elongate, 1 in. long and about 2 in. apart from centre to centre; pericarp thin, smooth; placenta enlarged opposite the seeds which embrace it. *Seeds* fusiform, 1 to 1.25 in. long, concave on the ventral surface, ending in a somewhat dilated cup-shaped tip, which bears a silky white coma up to 2 in. long; testa thin, minutely pubescent; albumen scanty; cotyledons oblong, .2 in. long; radicle cylindric, as long as cotyledons.

PENANG: *Curtis* 1455, 3025. PERAK: *Wray* 2308, 3459; *Scortechini* 58, 1838; *King's Collector* 3337, 3640, 5687, 7491. MALACCA: *Griffith*; *Maingay* (K.D.) 1078; *Hervey*; *Derry* 1013, 1206; *Goodenough* 1241; *Ridley* 10790. SINGAPORE: *Ridley* 2713, 2721; *Cantley* 140; *Hullett* 849.—DISTRIB. Tenasserim (*Lobb*); Borneo (*Haviland* 1598, 1796; *Fraser* 255); Sumatra (*Forbes* 2951).

3. PARAMERIA DENSIFLORA, Oliv. in Hook. Ic. Pl. t. 1520 (1886). A shrub; branchlets stout, about .25 in. in diameter, fistular, densely rusty-tomentose. *Leaves* chartaceous; obovate, oblong or oblanceolate, abruptly acuminate at apex, cuneate and at last rounded at base, glabrous and shining on the upper surface, sparsely pilose on the lower surface, especially on the nerves; margins recurved; 5 to 8 in. long, 1.75 to 2.5 in. broad; midrib stout; main nerves 6 to 8 pairs, at an angle of about  $30^\circ$  with the midrib; at first nearly straight, then curving upwards to anastomose near the margin, impressed above; secondary nerves short; reticulations transverse, distant, not promi-



nent; petiole stout, channelled, about .2 in. long. *Inflorescence* terminal, or axillary to the upper leaves, rusty-pubescent, densely corymbosely paniculate, sessile, reaching 6 in. in length, and about 4 to 5 in. in breadth; main peduncles 1 to 1.5 in. long, flattened, stout; branches opposite or verticillate, also flattened, as are the minor and much shorter branches; pedicels slender, about .15 in. long; bracts leafy; bracteoles small, ovate, acute; buds broadly clavate. *Calyx* very small; lobes ovate, acute, pubescent without, glabrous within, .03 in. long; scales 3 to 5 to each lobe, obscure. *Corolla* funnel-shaped; tube rather slender, minutely pubescent without, .15 in. long; lobes ovate-oblique, twisted to the right, glabrous. *Anthers* apiculate; filaments very short. *Ovary* almost glabrous; style short, obconic; stigma conical. *Follicles* slender, 11 to 14 in. long, nearly at right angles and curved inwards, distantly torulose, the spaces 1 to 1.25 in. long; the swellings ellipsoid, .5 in. long; interspaces less near the tip; pericarp brown, minutely rusty-puberulous at first, afterwards glabrescent. *Seeds* 10 to 12, .4 in. long, oblong, curved, obtuse at the tip, glabrous, dark reddish brown, the tip with a tuft of tawny bristles surrounding a white silky coma 1 in. long; integuments 2, the outer hard.

PENANG: on Government Hill, *Curtis* 158; *Hullett* 159.

## 22. ECDYSANTHERA, Hook. & Arn.

Glabrous climbing shrubs. *Leaves* opposite, acuminate with distant main nerves. *Flowers* small, white or pink, in terminal or axillary lax trichotomous paniculate cymes. *Calyx* small, deeply 5-fid, with few or no glandular scales at the base within. *Corolla* suburceolate, the throat naked; lobes 5, very short, obtuse, overlapping to the right, hardly twisted. *Stamens* inserted at the base of the corolla-tube, included; filaments short; anthers sagittate, conniving over and adhering to the stigma; cells produced at the base in empty spurs. *Disk* annular. *Ovary* of 2 distinct carpels, longer than the disk; style short; stigma obpyriform; ovules many. *Fruit* of 2 divaricate, terete, acuminate follicular mericarps. *Seeds* few, oblong or linear, compressed, little contracted at the apex and crowned by a persistent ring of short hairs and a long deciduous coma; albumen scanty; cotyledons oblong or ovate, leafy; radicle short.—DISTRIB. India, Malaya and Southern China; about 4 or 5 species.

Cymes terminal, branches rather stout; leaves with main nerves very oblique (45°) to the midrib .. ..	1. <i>E. micrantha</i> .
Cymes lateral, branches slender; leaves with main nerves at about 60° with the midrib .. ..	2. <i>E. multiflora</i> .

1. *ECDYSANTHERA MICRANTHA*, A. DC. Prodr. VIII. 442 (1844). A large climbing shrub; branches slender, pendulous, lenticellate; branchlets brown, terete, lenticellate; innovations sometimes puberulous. *Leaves* membranous; ovate-lanceolate to oblong-lanceolate, obtusely acuminate at apex, acute or cuneate at base; glabrous on both surfaces, often reddish-brown when dry; 2 to 7 in. long, 1 to 2 in. broad; midrib slender; main nerves 3 to 5 pairs, at about  $45^\circ$  with the midrib, curved upwards to and along the margin and prominently connected by the transverse reticulations, often with a small tuft of hairs in the axils beneath; petiole .3 to .5 in. long, somewhat twisted. *Cymes* puberulous, trichotomous, reaching about 5 in. in length and breadth; main peduncles stout, variable; branch peduncles spreading, 1 to 2 in. long; cymules corymbose, many-flowered; pedicels slender, short, about .1 in. long; bracts linear, caducous; bracteoles very small, ovate-acute; buds ovoid. *Calyx* very small; lobes ovate, acute, pubescent, ciliate. *Corolla* urceolate, glabrous, very small (.05 in. long); lobes falcate, spreading. *Anthers* obtuse, sometimes with a small apiculus. *Ovary* puberulous, twice as long as the disk. *Follicles* 3 to 4 in. long, .75 in. broad near the base, horizontal, slightly recurved, narrowed from above the base to the point; exocarp fleshy, punctate; endocarp shining, crustaceous. *Seeds* elliptic-lanceolate, .75 in. long, .25 in. broad, compressed, narrowed above and bearing a ring of short tawny bristles and ending in a white silky coma 1.5 to 2.5 in. long; testa rusty-pubescent, thin; cotyledons oblong, leafy, about .3 in. long; radicle cylindric, about .15 in. long. Hook. f. Fl. Br. Ind. III. 662; Miq. Fl. Ind. Bat. II. 451. *E. brachiata*, A. DC. l.c. 443; Kurz in Journ. As. Soc. Beng. XLVI. ii. 255, and For. Fl. II. 189; Miq. l.c. 452. *Echites? micrantha* and *brachiata*, Wall. Cat. 1667, 1668; G. Don Gen. Hist. Dichl. Pl. IV. 75.

PERAK: *Scortechini*.—DISTRIB. India (Sikkim, Assam, Khasia Hills and Cachar), Burma.

The only specimen available is rather a poor one, but we see no reason to doubt its identity. The description of the fruit and seeds is taken from Indian specimens.

2. *ECDYSANTHERA MULTIFLORA*, King & Gamble, n. sp. A large climbing shrub; branchlets pendulous, terete, prominently lenticellate; innovations slightly puberulous. *Leaves* membranous, ovate or ovate-lanceolate, long acuminate often abruptly and obtusely at apex the acumen oblique, attenuate and almost rounded at base; glabrous on both surfaces; margins slightly recurved; 2 to 3 in. long, 1 to 1.5 in. broad; midrib slender, impressed above, raised beneath; main nerves 4 to 5 pairs, the lowest close to the margin, all at about  $60^\circ$  with the midrib and curving upwards to and along the margin and connected by

the parallel transverse reticulations, often with minute tufts of hair in the axils beneath; petiole .4 to .6 in. long, slender, articulate. *Cymes* lateral, trichotomous, rusty-puberulous. very many-flowered, reaching 6 in. or even more in length and breadth; main peduncles 1 to 2.5 in. long, slender; branches many, slender, gradually lessening; ultimate cymules corymbose; pedicels filiform, .1 to .2 in. long; bracts none or very caducous; bracteoles minute, ovate-acuminate; buds oblong. *Calyx*-lobes ovate acute, with minute glands at the base within, pubescent without. *Corolla* urceolate, .06 in. long; lobes short, very slightly twisted to the left. *Anthers* acuminate, basal spurs rather long. *Fruit* not seen.

PERAK: on Larút Peak at 2000 to 3000 ft., *King's Collector* 2294, 2401.

### 23. CHONEMORPHA, G. Don.

Stout woody climbing shrubs. *Leaves* opposite, broad, with arching pinnate nerves. *Flowers* large, white, in lax terminal and pseudo-axillary, bracteolate, paniculate cymes. *Calyx* tubular, 5-fid or -partite, with a ring of glands at the base inside. *Corolla* hypocrateriform; tube cylindric, but slightly expanded both at base and apex, without scales; lobes 5, broad, overlapping to the right, twisted sharply to the left. *Stamens* 5, included, inserted on the throat of the corolla; filaments very short, broad, villous; anthers sagittate, acuminate, connivent over and adhering to the stigma, their cells shortly spurred at the base. *Disk* thick, annular or cupular, entire or 5-lobed. *Ovary* of 2 distinct carpels; ovules many; style filiform, cleft at the base; stigma conoid or sub-clavate. *Fruit* of 2 long, straight, woody, parallel, triquetrous follicular mericarps. *Seeds* ovoid or oblong, flat, produced in a beak, which is again surmounted by a long silky coma; albumen thin; cotyledons flat, thick, oblong; radicle short.—DISTRIB. India and Malaya; 2 to 3 species.

CHONEMORPHA MACROPHYLLA, G. Don Gen. Hist. Diehl. Pl. IV. 76 (1838). A large climbing shrub with copious milky juice; branches stout, warty; branchlets stout, soft, fistular, pubescent, becoming glabrous in age. *Leaves* coriaceous; broadly elliptic to elliptic-obovate or suborbicular, blunt, notched or shortly abruptly acuminate at apex, rounded or cordate at base; both surfaces glabrous or glabrescent when old, the lower pubescent, hirsute or tomentose when young; margins slightly recurved; 6 to 10 in. long, 3.5 to 6 in. broad; midrib very stout, impressed above, prominently raised beneath; main nerves spreading, 8 to 10 or sometimes 12 pairs, at variable distances and irregular and often branched, prominently raised beneath; secondary nerves many,

joining the irregular transverse reticulations, all much raised beneath; petiole stout, .5 to 1.5 in. long. *Panicles* up to 10 in. long and 8 in. broad, pubescent; peduncles stout, 3 to 4 in. long; branches also stout, angled or flattened, more or less racemose; bracteoles ovate, acute, persistent; pedicels about .3 to .4 in. long, usually shorter than the calyces; buds clavate, the tip acute; flowers white. *Calyx* tubular, wider than the corolla-tube and less than half its length; the mouth with 5 short rounded or subacute teeth. *Corolla* 3 in. or more across; tube .75 to 1 in. long, villous within in 5 bands between the stamens; lobes spreading, obovate-cuneate. *Anthers* .5 in. long. *Follicles* 12 to 18 in. long, straight, boldly 3-angled, the tips incurved, .75 to 1 in. broad; pericarp woody. *Seeds* about 1 in. long, ovate below, narrowed half-way up into a beak and again expanded to receive the coma, which is softly white silky and 2.5 in. long; albumen very thin; cotyledons ovate-oblong, thick, .5 in. long; radicle cylindric, slender, .25 in. long. A. DC. Prodr. VIII. 430; Wight Ic. t. 432; Brandis For. Fl. 328; Kurz in Journ. As. Soc. Beng. XLVI. ii. 257, and For. Fl. II. 187; Miq. Fl. Ind. Bat. II. 444; Hook. f. Fl. Br. Ind. III. 661; Trimen Fl. Ceyl. III. 138; Cooke Bomb. Fl. II. 139; Prain Beng. Plants 678. *C. mollis*, Miq. l.c. *Echites macrophylla*, Roxb. Fl. Ind. II. 13; Wall. Cat. 1657. *E. grandis*, Wall. Cat. 1658; Dalz. & Gibs. Bomb. Fl. 147, "*Belutta-kaka-kodi*," Rheede Hort. Mal. IX. tt. 5, 6.

PENANG: *Ridley* 3441; *Curtis* 832. PERAK: *Wray* 2183, 2685, 3661; *Scortechini* 921; *King's Collector* 3636, 6000, 7304, 10574. MALACCA: *Maingay* (K.D.) 1074; *Derry* 543.—DISTRIB. India, Ceylon, Malay Archipelago.

#### 24. RHYNCHODIA, Benth.

Large climbing shrubs. *Leaves* opposite, membranous, broad, penninerved. *Flowers* in lax, broad, axillary or subterminal, paniculate cymes. *Calyx* 5-partite or -fid; lobes about as long as tube; glandular scales many. *Corolla* hypocrateriform; tube enlarged opposite the stamens, contracted at the throat, villous; lobes large, twisted, obliquely obcuneate or obovate-falcate, twisted to the left, overlapping to the right. *Stamens* inserted on the middle of the tube; filaments broad, short; anthers sagittate, conniving round and adhering to the stigma; cells with narrow incurved spurs. *Disk* annular, 5-fid. *Ovary* of 2 distinct carpels, longer than the disk; style slender, with an ovate truncate top; stigma columnar. *Fruit* of 2 narrow parallel compressed follicular mericarps. *Seeds* ovate or oblong, compressed, produced in a slender beak which is crowned by a deciduous coma;



albumen none; cotyledons oblong; radicle short, superior.—DISTRIB. One species, from India to China.

*RHYNCHODIA WALLICHII*, Benth. in Gen. Pl. II. 720 (1876). A large climbing shrub; branches distantly tubercled; branchlets glaucescent, rough, lenticellate, the scars of fallen leaves prominent. *Leaves* membranous; elliptic-ovate or -oblong, cuspidately or caudately acuminate at apex, cuneate sometimes unequally at base or occasionally rounded or even cordate; glabrous and shining above, glabrous or puberulous beneath; 5 to 9 in. long, 2 to 4 in. broad; midrib slender, raised beneath; main nerves 7 to 10 pairs, starting at an angle of about 50° with the midrib and curving upwards to and along the margin, where they anastomose to form a looped intramarginal nerve, raised beneath as are the few secondary nerves and the rather prominent transverse reticulations; petiole .75 to 1 in. long, slender, grooved, with small auricle-like stipular glands at the base. *Cymes* lax, axillary or subterminal, di-tri-chotomous, puberulous, reaching 5 in. long and about 7 in. in breadth; peduncles 1 to 3 in. long, slender, angled, puberulous or glabrous; branches long, slender, ultimate cymules subumbellate; pedicels .3 to .5 in. long; bracts oblong-lanceolate, ciliate, caducous; bracteoles at the bases of the pedicels, ovate-lanceolate, scarious, .1 in. long; buds clavate with conical tip; flowers white tinged with pink. *Calyx* campanulate; tube .1 to .15 in. long, furnished with many broad bifid scales at the base within; lobes linear-oblong, ciliate, obtuse, as long as the tube, margins reflexed. *Corolla*-tube broadly inflated opposite the stamens, 5-angled, .25 in. long, villous within, the throat narrowed; lobes obovate-falcate, about .5 in. long, slightly villous on the inner face. *Anthers* .15 in. long; spurs very slender. *Follicles* 12 to 18 in. long, pendulous. *Seeds* ovate-oblong; body .5 in. long; beak very slender, as long as body, crowned by a white silky coma 1.5 in. long; testa leathery, keeled on one side; cotyledons fleshy, flattened, .3 in. long, .1 to .15 in. broad; radicle thick, cylindric. Hook. f. Fl. Br. Ind. III. 667. *Rhyncospermum Wallichii* and *R. ellipticum*, A. DC. Prodr. VIII. 431. *Echites rhyncosperma*, Wall. Pl. As. Rar. I. 43, t. 49; Cat. 1665. *E. elliptica*, Wall. Cat. 1666. *E. verticalis*, Herb. Ham. *Cercocoma Wallichii*, Miq. Fl. Ind. Bat. II. 445; Kurz in Journ. As. Soc. Beng. XLVI. ii. 255, and For. Fl. II. 187.

KEDAH: on Langkawi Island, *Curtis* 3203. PERAK: *Scortechini* 1774; *King's Collector* 5635, 8790.—DISTRIB. India (Sikkim Himalaya, Assam), Burma, Tonkin.

## 25. ANODENDRON, A. DC.

Large glabrous climbing shrubs. *Leaves* opposite, with distant

nerves. *Flowers* in axillary or terminal trichotomous leafy paniculate cymes. *Calyx* small, 5-partite, glandular or not within. *Corolla* hypocrateriform; the tube cylindric, little dilated opposite the stamens; the mouth contracted, without scales; lobes narrow, overlapping to the right, twisted to the left, conical and spirally striate in bud. *Stamens* inserted below the middle of the tube; filaments very short; anthers sagittate, connivent round and adhering to the stigma; the cells shortly spurred at the base. *Disk* annular or cupular, entire or undulate. *Ovary* of 2 distinct carpels sunk in the disk and attached to it by their backs at the base, many-ovuled; style very short; stigma thick, conical, bi-lobed. *Fruit* of 2 divaricate acuminate follicular mericarps. *Seeds* few, ovoid or oblong, compressed, beaked, tipped with a long coma which extends down the upper part of the beak more or less; albumen usually copious; cotyledons ovate, subcordate, flat; radicle superior.—DISTRIB. India and Malaya; about 7 species.

Flowers in many-branched, many-flowered, cymes, usually 6-in. long or more; buds under .25 in. long; leaves coriaceous, more than 4 in. long and 1.5 in. broad, with prominent nerves:—

Main nerves 12 to 15 pairs, about .5 in. apart; corolla-lobes villous within and at the throat, over .1 in. long; follicles with thick pericarp; seeds obovoid, beak .25 in. long, the coma shortly decurrent only .. .. . 1. *A. paniculatum*.

Main nerves 8 to 10 pairs, about .75 to 1 in. apart; corolla-lobes nearly glabrous within and at the throat, .05 in. long; follicles with thin pericarp; seeds oblong, beak 1 in. long, the coma decurrent on the upper half. . . . . 2. *A. Candolleum*

Flowers in few-branched, few-flowered, generally axillary cymes, usually under 1 in. long; buds at least .5 in. long; leaves chartaceous, usually under 4 in. long and 1.5 in. broad, with slender nerves; follicles with thin pericarp; the seeds obovoid, the beak over 1 in. long, coma decurrent on the upper half, very long .. .. . 3. *A. pauciflorum*.

Flowers in branched, corymbose, terminal cymes reaching 3 in. in length; buds .4 to .5 in. long; leaves coriaceous, under 3.5 in. long and 1.75 in. broad, with nerves nearly at right angles to the midrib .. .. . 4. *A. Wrayi*.

Flowers in axillary, panicle, branched cymes reaching 2.5 in. in length; buds .225 in. long; leaves coriaceous, oblong-lanceolate, reaching 3.5 to 5.5 in. long and 1 to 1.5 in. broad, with nerves at about 75° with the midrib .. .. . 5. *A. lanceolatum*.

1. *ANODENDRON PANICULATUM*, A. DC. Prodr. VIII. 444 (1844). A very large climbing shrub with greyish-brown bark; branchlets stout, rather fleshy, dark brown, glabrous, terete. *Leaves* thinly coriaceous; ovate, elliptic or elliptic-oblong, shortly and abruptly acuminate at apex,

cuneate and rounded at base; both surfaces glabrous; margins slightly recurved; 4 to 8 in. long, 1·5 to 3 in. broad; midrib stout, impressed and keeled above, raised beneath; main nerves 12 to 15 pairs, parallel, ·4 to ·6 in. apart along the midrib, starting at an angle of from 60° to 70° with the midrib and arching upwards to and along the margin where they anastomose; secondary nerves few, short, between the main nerves; reticulations transverse, conspicuous only in young leaves when dry; petiole ·5 in. long, stout, slightly winged. *Cymes* axillary and terminal, repeatedly trichotomously branched, reaching about 10 in. in length and 6 in. in breadth, glabrous; peduncles slender, angled, ·5 to 1 in. long; successive branchings similar but shorter; ultimate cymules 3-flowered; bracts similar to the leaves and gradually smaller; bracteoles ovate acute, in pairs at the bases of the upper cyme-branches and of the pedicels, which are about ·05 to ·1 in. long; buds conical, striated spirally by the twisted lobes of the corolla; flowers white or pale yellow. *Calyx*-lobes ovate, rounded, ciliate, the margins somewhat scarious, ·06 in. long; scales none or very minute. *Corolla*-tube cylindric, dilated opposite the stamens and then contracted at the throat, ·06 in. long; lobes oblong falcate, villous within and at the throat, ·1 to ·125 in. long, twisted sharply to the left. *Anthers* sagittate, acuminate, ·04 in. long; spurs short. *Disk* cupular, entire, undulate, nearly enclosing the adherent glabrous carpels. *Style* almost none; stigma conical with an annular base. *Follicles* hard, woody, divergent in one line, 3 to 6 in. long, ·5 to ·75 in. broad near the base and thence narrowed to the blunt tip. *Seeds* few, obovoid, flattened, ·5 to 1 in. long; beak ·25 in. long, slender, slightly broadened at the tip, and bearing a 2 in. long white-silky spreading coma which extends a short way down the tip; testa dark brown, thin; albumen copious; cotyledons oblong, rounded, ·4 in. long by ·25 in. broad, prominently nerved; radicle cylindric, ·15 to ·2 in. long. Dalz. and Gibs. Bomb. Fl. 147; Kurz in Journ. As. Soc. Beng. XLVI. ii. 255, and For. Fl. II. 188; Wight Ic. t. 1309 (*fruit and seeds only*); Hook. f. Fl. Br. Ind. III. 668; Miq. Fl. Ind. Bat. II. 454; Trimen Fl. Ceyl. III. 141; Cooke Fl. Bomb. II. 141; Prain Beng. Plants 679. *Echites paniculata*, Roxb. Fl. Ind. II. 17; Wight Ic. t. 396. *E. coriacea*, Wall. Cat. 1586. *E. manubriata* and *E. polyantha*, Wall. Cat. 1663, 1664. "*Kaka-kodi*," Rheede Hort. Mal. IX. t. 8.

JUNKSEYLOM (Tongka): at Puket, Curtis 2933. PENANG: Curtis 1740.—DISTRIB. Western India, Ceylon, Eastern Bengal, Burma, Malay Archipelago, Philippines.

2. ANODENDRON CANDOLLEANUM, Wight Ic. t. 1309 (1850) (*excluding fruit and seeds*). A very large glabrous climbing shrub; branches stout, rather fleshy, somewhat angular, light brown; branch-

lets terete, darker. *Leaves* coriaceous; elliptic, abruptly cuspidate acuminate at apex, cuneate or rounded at base; pale beneath, glabrous on both surfaces, margin recurved; in old leaves slightly cartilaginous; 5 to 9 in. long, 2 to 5 in. broad; midrib stout, impressed and keeled on the upper, raised on the lower, surface; main nerves 8 to 10 pairs, the lowest near the margin, the rest parallel, yellowish, very stout and prominent, about .75 to 1 in. apart along the midrib in old leaves, raised above, starting at from 75° to 80° with the midrib and curving only near the margin and along it; secondary nerves few; reticulations transverse, not prominent, impressed when dry; petiole 1.5 to 2 in. long, stout, twisted, keeled above. *Cymes* terminal and axillary, repeatedly 3-chotomously branched, reaching about 9 in. in length and 4 to 5 in. in breadth; peduncles terete, 1 to 1.5 in. long; branch peduncles long, slender, somewhat flattened; ultimate cymules in corymbose clusters; pedicels .1 to .15 in. long; bracts leafy; bracteoles ovate, acute, scarious, very small, caducous, in pairs at the nodes and below the pedicels; buds conical, spirally striate; flowers reddish or reddish-brown. *Calyx*-lobes ovate, somewhat acute; the margins scarious, not ciliate, .05 in. long; scales 0. *Corolla*-tube cylindrical, scarcely dilated, .05 in. long; lobes oblong falcate, glabrous except the slightly puberulous mouth, .05 in. long, twisted sharply to the left. *Anthers* sagittate, acute, .04 in. long; spur short. *Disk* cupular, entire, undulate, nearly enclosing the glabrous carpels. *Style* short, slender; stigma conical with an annular base. *Follicles* slender, straight, 6 to 7 in. long, .4 in. broad at the broadest one-third of the length up, long-acuminate, slightly turned backwards; pericarp chartaceous, smooth. *Seeds* oblong, flattened, the margins incurved, about 1 in. long, produced in a slender beak of the same length, the upper half of which is furnished with a white silky coma 2 to 2.5 in. long; testa thin, dark brown; albumen copious; cotyledons ovate, acute, .75 in. long, .25 in. broad, prominently nerved; radicle .2 to .25 in. long, cylindric, Hook. f. Fl. Br. Ind. III. 669; Miq. Fl. Ind. Bat. II. 455. *A. rubescens*, Teysm. & Binnend. Cat. Hort. Bogor.

PENANG: West Hill, *Curtis* 2258. PERAK: *King's Collector* 5558, 6516, 7900, 8702. MALACCA: *Capt. Wight*; *Maingay* (K.D.) 1087.—  
DISTRIB. Borneo.

3. ANODENDRON PAUCIFLORUM, Hook. f. Fl. Br. Ind. III. 669 (1882). A climbing shrub; branches smooth glabrous; branchlets terete, dark brown. *Leaves* chartaceous; oblong or oblong-lanceolate, obtusely acuminate at apex, cuneately attenuate at base; glabrous on both surfaces, greenish above and reddish-brown beneath when dry; margins thin, pale when dry or cartilaginous; 3 to 4 occasionally to 5 in. long,



1.25 to 1.5 in. broad; midrib slender; main nerves slender, 8 to 10 pairs, at an angle of about  $60^\circ$  with the midrib, slightly curved to and along the margin; reticulations indistinct; petiole stout, .2 to .3 in. long, winged by the decurrent edges of the blade. *Cymes* terminal and axillary, much shorter than the leaves (rarely .75 to 1 in. long), few- (3 to 15-) flowered; peduncles stout, usually .5 in. long; branches trichotomous, very short, corymbose; pedicels very short; bracts and bracteoles ovate, crowded, small; buds clavate, tip conical, acute and much striate by the twisted corolla-lobes; flowers white or yellowish. *Calyx*-lobes ovate, ciliate, .1 in. long; scales minute, between the lobes. *Corolla*-tube cylindric, dilated below opposite the stamens, gradually attenuate upwards to the narrow throat, .3 in. long; lobes linear-lanceolate, falcate, glabrous without, slightly pubescent within, much twisted to the left, as long as tube. *Anthers* sagittate, with a hyaline apex; filaments very short, broad. *Disk* cupular, glabrous, undulate. *Stigma* sessile, pyriform. *Follicles* straight, divaricate at about  $100^\circ$  to  $120^\circ$ , 4 to 5 in. long, .6 to .7 in. broad a little above the rounded base, then narrowed to the acuminate, slightly incurved tip; pericarp thick, smooth, dark green. *Seeds* obovoid, .6 in. long by .3 in. broad, flat, slightly hooked below, narrowed above to a long slender beak of 1 to 1.25 in. long, the upper half of which is furnished with a spreading white-silky coma 3 to 3.5 in. long; testa thin, dark brown; albumen rather scanty; cotyledons ovate, .45 in. long by .2 to .25 in. broad, fleshy; radicle cylindric, .25 in. long.

PENANG: *Maingay* (K.D.) 1101; *Curtis* 663, 1457, on Government Hill at 1000 to 2000 ft. PERAK: *Wray* 2105, 2569; *King's Collector*, 5587, 5599.

4. *ANODENDRON WRAYI*, King & Gamble, n. sp. A climbing shrub; branches stout, fleshy, with fibrous inner bark and grey outer bark studded with minute lenticels. *Leaves* coriaceous; obovate or obovate-oblong, rounded at apex, with a minute glandular apiculus, cuneate at base; both surfaces glabrous; margin cartilaginous, recurved; 2 to 3.5 in. long, 1 to 1.75 in. broad; midrib very stout, impressed above; main nerves 14 to 16 pairs, parallel, at an angle of  $80^\circ$  or more with the midrib, straight and only slightly curved near the margin, raised above; secondary nerves occasional; reticulations indistinct; petiole .1 to .2 in. long, stout, wrinkled. *Cymes* terminal, corymbose, 3-chotomous, reaching about 3 in. long and broad; peduncles about .6 in. long; branches as long; pedicels slender, .3 in. long; buds clavate, tips conical, striated by the twisted corolla-lobes; flowers greenish yellow. *Calyx*-lobes ovate, acute, .06 in. long, glabrous, with 3 to 4 rounded scales at the base of each. *Corolla*-tube cylindric, slightly constricted in the middle above the stamens, .25 in. long, glabrous without, densely pubescent within;

lobes ovate, .2 to .25 in. long, rounded, densely tomentose within, twisted to the left. *Stamens* inserted just above the base of the corolla-tube; filaments very short; anthers sagittate; spurs incurved, as long as the pollen-bearing cells. *Disk* cupular, glabrous, undulate. *Ovary* of 2 carpels adherent to the disk; style short, obconoid at top; stigma conoidal. *Fruit* not known.

PERAK: at Gunong Bubu, 5000 ft., *Wray* 3828, 3836.

5. *ANODENDRON LANCEOLATUM*, King & Gamble, n. sp. A glabrous climbing shrub; branchlets stout, nearly black, longitudinally wrinkled when dry. *Leaves* coriaceous; oblong-lanceolate, tapering to a blunt acumination at apex, narrowly cuneate at base; both surfaces slightly shining, pale brown when dry; margins recurved, broadly crispate; 3.5 to 5.5 in. long, 1 to 1.5 in. broad; midrib stout, channelled above, prominent beneath; main nerves about 15 to 16 pairs, at about 75° with the midrib, straight to join an inconspicuous intramarginal nerve close to the edge; secondary nerves alternate with and similar to the main nerves, branched above; reticulations irregular; petiole .4 to .5 in. broad, channelled above, the edges connivent. *Cymes* axillary, paniculate, nearly half as long as the leaves, reaching 2.5 in. long and about 1.25 in. in diameter; peduncles 1 to 1.5 in. long, flattened, with sometimes a small branch at the base, the next joint of the rachis nearly .5 in. long; side branches short, cymules close; pedicels short, variable; bracteoles ovate, acuminate, small; buds slender, clavate with a conical tip, striated by the twisted corolla-lobes, .225 in. long; flowers pale buff (*Wray*). *Calyx* shortly campanulate, deeply lobed; lobes ovate, acute, ciliate, .06 in. long. *Corolla*-tube sub-cylindric, dilated below, somewhat constricted above, glabrous except at the base within, .15 in. long; lobes as long as tube, oblong-linear, much twisted. *Stamens* inserted near the base of the tube; anthers sagittate, .06 in. long, tip obtuse or emarginate; empty spurs slender. *Disk* cupular. *Ovary* of 2 carpels, conical; style almost none; stigma conical, acuminate. *Fruit* not known.

PERAK: at Tapa, *Wray* 1321.

## 26. *CLEGHORNIA*, Wight.

Glabrous climbing shrubs. *Leaves* opposite, membranous, acuminate, penninerved, the main nerves straight. *Flowers* small, in axillary or terminal paniced or corymbose cymes. *Calyx* small, 5-partite, with 5 didymous glands alternate with the lobes. *Corolla* hypocrateriform; lobes 5, overlapping to the right, twisted or not to the left. *Stamens* inserted below the middle of the corolla-tube, conniving over and adhering to the stigma; filaments short; anthers sagittate, the cells shortly spurred at the base. *Disk* of 5 scales, cleft at the apex.

*Ovary* of 2 carpels, sunk in the disk; style short, obconical; stigma conical, apiculate. *Fruit* of 2 long, acuminate, follicular mericarps. *Seeds* oblong, narrowed at the ends, tipped with a deciduous coma; albumen scanty; cotyledons linear, flat; radicle superior.—**DISTRIB.** Ceylon and Malaya; about 3 species.

Leaves elliptic or elliptic-oblong, over 1 in. broad; cymes	
paniculate; corolla-lobes linear-oblong, over .1 in. long	.. 1. <i>C. malaccensis</i> .
Leaves lanceolate; cymes corymbose; corolla-lobes rounded,	
under .05 in. long	.. .. 2. <i>C. gracilis</i> .

1. **CLEGHORNIA MALACCENSIS**, King & Gamble. A slender climbing shrub; branchlets pale brown, terete, often curved in the internodes. *Leaves* membranous; elliptic or elliptic-oblong, abruptly obtusely caudate-acuminate at apex, attenuate to almost rounded at base; bright green above, blueish-green beneath, nearly white when dry; margin recurved; 2 to 4 in. long, 1 to 1.5 in. broad; midrib slender, channelled above, raised beneath; main nerves 12 to 14 pairs, slightly impressed above, raised beneath, at about 70° to 80° sometimes at right angles to the midrib, straight and meeting in an intramarginal looped nerve; secondary nerves many, one usually between each pair of main nerves; reticulations few, inconspicuous; petiole .5 to 1 in. long, twisted. *Cymes* terminal, rarely axillary, paniculate, reaching 4 in. in length and breadth; peduncles slender, .75 to 2 in. long, flattened; branches trichotomous, flattened, variable; ultimate cymules subumbellate; pedicels .1 to .2 in. long; bracteoles ovate-subulate, very small; buds oblong-clavate; flowers waxy, white with yellow inside. *Calyx*-lobes lanceolate, ciliate, .075 in. long. *Corolla* tubular-campanulate, .2 to .25 in. long, glabrous except for a minute pubescence near the throat within; lobes as long as tube, linear-oblong; margins incurved, slightly twisted to the left. *Stamens* inserted a little above the base of the tube; filaments slender; anthers sagittate, pubescent on the back, bluntly apiculate; the basal spurs long. *Disk* of 5 slightly bifid scales. *Ovary* scarcely exsert from the disk; style slender; stigma oblong, conical above and often bifid at tip. *Follicles* divaricate at about a right angle, 2.5 to 5 in. long, .25 in. broad, slightly incurved, acuminate, glabrous. *Seeds* linear-oblong or fusiform, .4 to .5 in. long, ending in a flattish point covered with a rather short coma of silky hairs; testa thin, brown. *Baissea malaccensis*, Hook. f. in Fl. Br. Ind. III. 663.

PERAK: *Scortechini* 40; *Wray* 3457; *King's Collector* 5900, 8798, 10799. MALACCA: *Maingay* (K.D.) 1094.

2. **CLEGHORNIA GRACILIS**, King & Gamble, n. sp. A slender climbing shrub, the stem reaching 1 to 2 in. in diam.; branchlets very slender.

dark brown, often curved in the internodes. *Leaves* membranous; lanceolate, long but obtusely caudate-acuminate at apex, cuneate at base; bright green above, paler beneath; margins cartilaginous; 2 to 3 in. long, .5 to .7 in. broad; midrib slender; main nerves 12 to 16 pairs, at about 70° to 80° with the midrib, straight, meeting in an intramarginal looped nerve; secondary nerves frequent, usually one between each pair of main nerves; reticulations indistinct; petiole slender, .25 in. long. *Cymes* axillary and terminal, slender, corymbose, reaching 2 in. in length and breadth; peduncles very slender, .5 to .75 in. long; branches trichotomous, capillary; pedicels .2 in. long; bracteoles very minute, subulate; buds clavate; flowers light yellow. *Calyx*-lobes orbicular, .04 in. in diam.; scales very small or none. *Corolla* urceolate, .1 in. long; tube minutely white-puberulous within; lobes rounded, not twisted, .04 in. long. *Disk* faintly 5-lobed. *Anthers* blunt or slightly emarginate at the tip, with a slender hair-like apiculus. *Fruit* not seen.

PERAK: on Cawfield's hill, 4000 ft., *Scortechini* 384; at 3000 to 4000 ft., clinging to trees, *King's Collector* 6351; *Wray* 3209.

The following Bornean species may eventually be found in the Malay Peninsula:—

CLEGHORNIA BORNEENSIS, King & Gamble, n. sp. A climbing shrub; branchlets purplish-brown when dry, angled, smooth, glabrous. *Leaves* elliptic or elliptic-obovate, abruptly cuspidate-acuminate at apex, rounded at base; both surfaces glabrous, the lower pale; 4 to 5 in. long, 2 to 2.5 in. broad; midrib slender, raised and sharp beneath; main nerves 10 to 12 pairs, parallel, starting at about 70° with the midrib and curving gently upwards to and along the margin; secondary nerves few, chiefly between the upper main nerves; reticulations slender, oblique, more or less parallel; both main nerves and reticulations raised on both surfaces; petiole .2 in. long, bordered above by the crispate decurrent margins of the blade. *Flowers* in axillary and pseudo-terminal, glabrous, corymbose cymes, reaching 6 in. long and 3 in. broad; peduncles slender, .5 to 2.5 in. long; primary branches 3-chotomous, rest 2-chotomous; pedicels slender, variable, about .1 to .2 in. long; bracteoles small, ovate, in pairs at the axils and usually 2 in the middle of each pedicel; buds linear-oblong; flowers yellow. *Calyx* campanulate; lobes ovate-acute, thin, .1 in. long, with small scales alternate with them within at the base. *Corolla*-tube cylindric, very slightly dilated at the base, slightly funnel-shaped towards the naked mouth, .3 in. long; lobes ovate, rounded, only very slightly twisted to the left, .15 in. long; the tube and mouth slightly villous within. *Stamens* inserted at the very base of the tube; anthers sagittate, the spurs slender; filaments very short, thick. *Disk* 5-lobed, enclosing the glabrous nearly globose carpels; style thick, obconic; stigma conical, apiculate. *Fruit* not known.

BORNEO: near Kuching, *Haviland* and *Hose* 2169.



27. ICHNOCARPUS, Br.

Climbing shrubs with opposite leaves. *Flowers* small, in lax, many-flowered, terminal and axillary, paniculate cymes. *Calyx* 5-fid, glandular or not within. *Corolla* hypocrateriform, the throat contracted or villous; lobes narrowed to an obtuse point, overlapping to the right, the upper half of each lobe deflexed in bud. *Stamens* inserted at or below the middle of the corolla-tube; filaments very short; anthers sagittate, conniving over and adhering to the stigma; cells spurred at the base. *Disk* free, 5-lobed. *Ovary* of 2 distinct carpels, exserted from the disk, hairy; ovules many; style short, top obconic; stigma columnar. *Fruit* of 2 slender, spreading or divaricate, follicular mericarps. *Seeds* oblong, narrowed at the tip, ending in a deciduous coma; albumen copious; cotyledons long, flat; radicle short, superior.—DISTRIB. India, Malaya, Australia; species 5 or 6.

Leaves usually elliptic, acute, under 1·5 in. broad; inflorescence narrowly paniculate, very rusty-tomentose, under 3 in. long; corolla-tube globose opposite the stamens, contracted above; disk lobes capitate . . . . .

1. *I. frutescens*.

Leaves usually ovate, obtuse or acute, over 1·5 in. broad; inflorescence rather broadly paniculate, 3 to 5 in. long; rachis glabrescent; corolla-tube campanulate opposite the stamens, not contracted above; disk-lobes not capitate . . . . .

2. *I. ovatifolius*.

1. ICHNOCARPUS FRUTESCENS, Ait. Hort. Kew. ed. 2, II. 69 (1811). A much-branched and extensively climbing shrub; branchlets slender, tawny-pubescent; innovations fulvous-tomentose. *Leaves* very variable, chartaceous; elliptic elliptic-oblong or elliptic-lanceolate or lanceolate, acute or acuminate sometimes mucronate at apex, cuneate or slightly rounded-attenuate at base; glabrous on the upper surface, pale and softly red-tomentose or glabrescent beneath; 2 to 4·5 in. long, .75 to 1·5 in. broad; midrib slender, impressed above; main nerves 5 to 7 pairs, curved upwards to and along the margin; reticulations in a fine network, conspicuous in young leaves; petiole .1 to .3 in. long, reddish-tomentose. *Cymes* paniculate, 1 to 3 in. long, terminal and axillary, often forming an elongated leafy thyrsus at the ends of the branchlets, rusty-pubescent or -tomentose; peduncles short; branches trichotomous; pedicels stout or slender, .1 to .2 in. long, often 3 together; bracts leafy, caducous; bracteoles ovate, acute, very small; buds clavate, tip conical; flowers greenish- or yellowish- white. *Calyx*-lobes ovate-acute or lanceolate, .05 to .1 in. long; glands none. *Corolla*-tube .1 in. long, cylindric at base, dilated and nearly globose opposite the stamens and then again constricted; pubescent without where dilated, glabrous within; mouth with slightly thickened folds and villous; lobes .15 to .2 in.

long, linear-falcate, with a twisted sparsely hirsute tip, white-hirsute within. *Stamens* very small; anthers .05 in. long, with small spurs. *Disk* with 5 linear capitate lobes. *Ovary* of 2 villous carpels; style slender, .05 in. long; stigma globose, with a conical tip. *Follicles* very slender, cylindrical, 3 to 6 in. long, .1 to .15 in. broad, curved, rusty-pubescent at first, afterwards glabrous; pericarp thin. *Seeds* linear-cylindric, .4 to .75 in. long, very slender, deeply grooved, scarcely beaked, tipped with a scanty white coma 1 in. long; testa thin, dark brown; cotyledons linear, very thin, .3 to .4 in. long, very narrow; radicle barely .05 in. long. A. DC. Prodr. VIII. 315; Benth. Fl. Austral. IV. 315; Wight Ic. t. 430; Wall. Cat. 1674; Brandis For. Fl. 327; Dalz. & Gibs. Bomb. Fl. 147; Kurz in Journ. As. Soc. Beng. XLVI. ii. 256, and For. Fl. II. 186; Hook. f. Fl. Br. Ind. III. 669; Miq. Fl. Ind. Bat. II. 448 and Suppl. 556; Trimen Fl. Ceyl. III. 142; Cooke Fl. Bomb. II. 142; Prain Beng. Plants 680. *I. radicans*, Wall. Cat. 1676. *I. dasycalyx*, Miq. l.c. 449. *Echites frutescens*, Wall. Cat. 1674; Roxb. Fl. Ind. II. 12.

PERAK: *Scortechini* 2199; *King's Collector* 820, 7049, 10986.—  
DISTRIB. India, Ceylon, Burma, Sumatra, Java, Australia (Queensland).

2. *ICHNOCARPUS OVATIFOLIUS*, A. DC. Prodr. VIII. 435 (1844). A climbing shrub; branchlets blackish-brown, terete; innovations slightly rusty-pubescent. *Leaves* variable, chartaceous; orbicular ovate or elliptic, obtuse acute or cuspidate at apex, rounded or attenuate or cuneate at base; glabrous on the upper surface, glabrous and paler on the lower or the midrib, villous; margins slightly recurved; 3 to 6 in. long, 1.5 to 3 in. broad; midrib slender, impressed above; main nerves 5 to 6 pairs, curved upwards to and along the margin; secondary nerves few; reticulations elegantly netted, conspicuous on the under surface of young leaves, scarcely visible in old ones, impressed above as are the main nerves; petiole slender, usually pubescent, .4 to .6 in. long. *Cymes* paniculate, up to 5 in. long, terminal and axillary, often forming an elongated, broad, leafy thyrus at the ends of the branchlets; the rachises rusty-pubescent or glabrescent; the cymules densely pubescent; peduncles variable; branches trichotomous; pedicels stout, .05 to .1 in. long; bracts leafy or at the uppermost nodes; bracteoles very many, broadly ovate-acute, at the bases of the pedicels; buds obovate, tip rounded; flowers white. *Calyx* campanulate; tube .05 in. long; lobes ovate-acute or -acuminate, .06 in. long; glands none. *Corolla*-tube .1 in. long, pubescent, cylindric below, then dilated opposite the stamens; mouth not contracted, but thickened in a fold within; lobes .15 in. long, linear-falcate, villous within, especially at the tips, much twisted. *Stamens* very small; anthers .04 in. long, with small spurs, tip

acute. *Disk* with 5 linear-subulate, not capitate, lobes. *Ovary* of 2 villous carpels; style slender, .03 in. long; stigma globose, with a long conical tip. *Follicles* cylindric, divaricate, densely rusty-pubescent. Hook. f. Fl. Br. Ind. III. 670; Miq. Fl. Ind. Bat. II. 449. *I. affinis*, Herb. Ind. Or. Hook. f. & Th. *I. latifolius*, Herb. Ham. in Wall. Cat. 1652. *Echites affinis*, Roem. & Sch. Syst. IV. 393. *Springia indica*, Muell. & Van Heurck in Plant. Nov. Van Heurck 143.

PENANG: *Curtis* 810, 3082. PROVINCE WELLESLEY; *Ridley* 9392. PERAK: *Scortechini*; *Kunstler* 181; *King's Collector* 10531. MALACCA: *Griffith*; *Maingay* (K.D.) 1075, 1103. PAHANG: *Ridley* 2179. SELANGOR: *Ridley*.—DISTRIB. India (Sylhet and Khasia Hills), Sumatra, Borneo, Celebes, Timor, Philippines.

## 28. AGANOSMA, G. Don.

Stout evergreen climbing shrubs. *Leaves* opposite. *Flowers* in many-flowered, terminal or axillary, tomentose or puberulous cymes, large or medium-sized, often sweet-scented, usually white. *Calyx* 5-partite to the base or nearly so; lobes lanceolate, more or less gland-bearing at the base within. *Corolla* hypocrateriform, lower part of the tube cylindric, upper campanulate or cylindric, broader than the lower, bearing villous longitudinal bands behind the anthers; lobes broad or narrow, overlapping to the right, twisted more or less to the left. *Stamens* inserted on the base of the upper part of the corolla-tube; filaments very short; anthers sagittate, conniving over and adherent to the stigma; the cells spurred at the base, upper half only pollen-bearing. *Disk* cupular or cylindric, 5-lobed. *Ovary* of 2 distinct carpels, included in or somewhat exsert from the disk, usually hirsute, many-ovuled; style short, top urn-shaped; stigma columnar, conical at tip. *Fruit* of 2 terete, straight or curved, follicular mericarps. *Seeds* oblong-obovate or linear-obovate, flattened, not beaked, tipped with a deciduous silky coma; testa thin; albumen scanty; cotyledons oblong; radicle short, superior.—DISTRIB. India and Malaya; about 6 species.

Calyx-glands many, opposite the lobes, which are .25 in. long; ovary half-exsert from the disk; corolla-lobes narrow, linear; leaves with a prominent intramarginal nerve .. .. 1. *A. marginata*.  
Calyx-glands under 5, alternate with the lobes, which are .75 to 1 in. long; ovary included in the disk; corolla-lobes broad, rhomboid; leaves without a prominent intramarginal nerve .. 2. *A. calycina*.

1. *AGANOSMA MARGINATA*, G. Don Gen. Hist. Diehl. Pl. IV. 77 (1838). A stout scandent or subscandent shrub; branches stout, prominently dotted with raised warts; branchlets slender, brown, lenticellate; innovations glabrous or rusty-pubescent; nodes, both of branches and

branchlets, with prominent ridges. *Leaves* membranous; oblong-lanceolate or elliptic-oblong, acuminate at apex often abruptly, rounded at base; glabrous above, glabrous or pubescent beneath; 2 to 5 in. long, .75 to 1.5 in. broad; midrib slender, channelled above, raised beneath; main nerves 12 to 16 pairs at an angle of about 60° with the midrib, slightly arching to meet in a prominent intramarginal looped nerve, the lowest 1 or 2 pairs occasionally free, raised beneath; secondary nerves also prominent, usually one between each pair of main nerves; reticulations netted; petiole .15 to .25 in. long, slender. *Cymes* terminal or more often axillary, di-tri-chotomous, puberulous, variable in size but reaching to about 4 in. in length and 3 in. in breadth; peduncles about 1 to 2 in. long; branches gradually shorter; ultimate cymules corymbose; pedicels .15 in. long; bracts caducous; bracteoles linear-subulate, .25 in. long; buds cylindrical, slender; flowers white. *Calyx*-tube almost none; lobes lanceolate-acuminate, .25 in. long, glabrous or pubescent, nerved, with many small subulate glands at the base within, especially on the inner lobes. *Corolla*-tube cylindric above, enlarged at the base below the stamens and sometimes slightly constricted near the mouth, which is thickened, .25 in. long, glabrous except for 5 villous bands behind the anthers within; lobes narrow, linear, acute, .5 to .7 in. long. *Stamens* inserted a little above the base of the tube; anthers lanceolate-acuminate, .15 in. long; filaments very short. *Ovary* of 2 obtuse carpels, glabrous, half sunk in the disk; style slender, annulate at top; stigma conoidal. *Follicles* pendulous, slender, slightly divergent, .52 to 1.5 ft. long, .3 to .4 in. broad, glabrous, dark brown, speckled, at first joined at the tip. *Seeds* linear-oblong, .3 in. long, crowned with a silky coma 1.5 in. long; albumen very scanty. Wight Ic. t. 425; A. DC. Prodr. VIII. 433; Kurz in Journ. As. Soc. Beng. XLVI. ii. 256, and For. Fl. II. 186; Hook. f. Fl. Br. Ind. III. 663; Prain Beng. Plants 679. *A. acuminata*, G. Don l. c.; Wight Ic. t. 424; A. DC. l. c. 434; Miq. Fl. Ind. Bat. II. 447. *A. macrocarpa*, A. DC. l. c. 434; Miq. l. c. *Echites marginata*, Roxb. Fl. Ind. II. 15; Wall. Cat. 1661. *E. acuminata*, Roxb. l. c. *E. macrocarpa*, Wall. Cat. 1662. *E. reticulata*, Boj. Hort. Maur. 211. *E. apoxys*, Voigt Hort. Sub. Calc. 522. ? *E. cristata*, Roth. Nov. Pl. 135. ? *Chonemorpha cristata*, G. Don l. c. 76.

TRANG: *Curtis* 3393; *King's Collector* 1426. KEDAH: on Langkawi Island, *Curtis* 2792. PENANG: *Curtis* 664. PERAK: *Scortechini* 6, 7, 68; *King's Collector* 7321. MALACCA: *Griffith*; *Maingay* (K.D.) 1076, 1000 to 1002. PAHANG: *Ridley* in Trans. Linn. Soc., Ser. 2, III. 3219. SINGAPORE: *Murton* 74.—DISTRIB. India (Sylhet and Chittagong), Burma, Java, Sumatra, Philippine Islands.



2. *AGANOSMA CALYCINA*, A. DC. Prodr. VIII. 432 (1844). An immense (Scortechini) climbing shrub; branchlets stout, as thick as a goosequill, ferruginous-puberulous; nodes faintly ringed. *Leaves* coriaceous-chartaceous; elliptic or elliptic-oblong or elliptic-ovate, shortly and abruptly acuminate at the rounded apex, attenuately rounded at base; glabrous on both sides except for a few sparse hairs beneath; margins recurved; 3·5 to 6 in. long, 1·5 to 3·5 in. broad; midrib stout, impressed above, raised beneath; main nerves 7 to 10 pairs, starting at an angle of about 80° to 85° with the midrib and curving upwards to and along the margin; secondary nerves few, inconspicuous; reticulations minutely netted, impressed and prominent beneath; petiole ·5 in. long, articulate. *Cymes* terminal, sessile, dichotomous, rusty-puberulous, corymbosely flattened, reaching to 5 in. in length and 8 in breadth; main peduncles 1 to 3 in. long, somewhat flattened, stout; branches similar but shorter and thinner; pedicels ·5 to ·75 in. long; bracts leafy, ovate-acuminate, caducous; bracteoles lanceolate, similar to calyx-lobes; buds conical; flowers large, white, handsome. *Calyx*-lobes lanceolate acuminate, ·75 to 1 in. long, fulvous-tomentose, the inner 3 broadly keeled on the back; scales minute, subulate, 3 to 5 at the base within and between the lobes. *Corolla*-tube cylindric, rather stout, lower part narrowed, upper part broad and then slightly narrowed upwards, ·4 to ·5 in. long, 5-sulcate, pubescent without, ferruginous-villous within in bands behind the stamens; lobes rhomboid, broad, half glabrous, half tomentose, as long as tube, twisted to the left. *Stamens* inserted on the broadest part of the tube within; filaments very short, densely villous; anthers sagittate, very slender, ·3 in. long; basal spurs somewhat rounded; connective pubescent. *Disk* glabrous, conical, 5-furrowed and -lobed, ·15 in. long, enclosing the ovary. *Ovary* of 2 carpels, glabrous below, long-villous above; style slender, enlarged upwards and dilated into a villous lobed cup; stigma conical, elongate. *Fruit* not seen. Kurz in Journ. As. Soc. Beng. XLVI. ii. 256, and For. Fl. II. 186; Hook. f. Fl. Br. Ind. III. 664. *A. Roxburghii*, G. Don Ex. Wight Ic. t. 440. *A. Wallichii*, G. Don Gen. Hist. Dichl. Pl. IV. 77. *Echites calycina*, Wall. Cat. 1653. *E. caryophyllata*, Roxb. Fl. Ind. II. 11.

PERAK: *Scortechini* 16, from Gunong Chabary; *King's Collector* 10808.—DISTRIB. Tavoy.

## 29. TRACHELOSPERMUM, Lemaire.

Climbing shrubs. *Leaves* opposite, penninerved. *Flowers* white or purplish, in lax terminal or pseudo-axillary cymes. *Calyx* small, 5-partite, with 5 to 10 small scales or glands at the base within. *Corolla* hypocrateriform, the tube cylindric, dilated opposite the stamens, con-

stricted at the mouth and sometimes almost closed with the folds; lobes 5, oblique, twisted to the left, overlapping to the right. *Stamens* inserted above the middle of the tube, included or the apices shortly exsert; filaments very short, broad; anthers sagittate, shortly acuminate, connivent around the stigma and adhering to it; the cells produced below in sharp spurs. *Disk* annular, truncate or 5-lobed. *Ovary* of 2 carpels, longer than the disk; style filiform; stigma columnar, base shortly ringed, tip conical; ovules very numerous. *Fruit* of 2 elongate incurved follicular mericarps. *Seeds* linear, not beaked, crowned at the apex with a long dense coma; albumen copious; cotyledons linear, flat; radicle short, superior.—*DISTRIB.* India, Malaya and Eastern Asia as far as Japan; about 8 species.

*TRACHELOSPERMUM CURTISH*, King & Gamble, n. sp. A climbing shrub; branchlets terete, slender, uppermost with innovations and inflorescence tawny-villous; nodes with a prominent pubescent ridge. *Leaves* membranous; elliptic or elliptic-ovate, abruptly acuminate at apex, auriculately cordate at base; strigosely hispid on both surfaces especially on the nerves, finally glabrous; 3 to 5 in. long, 2 to 3 in. broad; midrib slender, impressed and keeled in old leaves; main nerves 8 to 10 pairs, the lowest pair small deflexed, the rest at about 50° to 60° with the midrib, curved upwards to meet in an inconspicuous looped intramarginal nerve, and joined by the prominent transverse reticulations; petiole .3 to .5 in. long, tawny-villous. *Cymes* terminal, sessile, corymbose, tawny-villous, up to 6 in. long and 8 in. in diam.; main branches 3 to 5; cymules congested; pedicels short, .1 to .2 in. long; bracts leafy, caducous; bracteoles linear-subulate, densely tawny-villous at the joints and the bases of the pedicels; buds clavate, apex conoidal; flowers white, very sweet-scented. *Calyx*-lobes linear-lanceolate, slightly villous without, .1 in. long, longer than the tube, with small subulate scales at the base between the lobes. *Corolla*-tube narrowed below, then dilated opposite the stamens, then gradually narrowed to the constricted mouth, .5 to .6 in. long in all, glabrous within; lobes obliquely triangular-spathulate, dentate at apex, .4 to .5 in. long, twisted to the left, glabrous. *Stamens* inserted at or a little below the middle of the tube; filaments stout, short, rugose, decurrent below; anthers sagittate, membranously apiculate; spurs as long as or longer than the pollen-bearing cells, slender, incurved below. *Disk* annular, 5-lobed, fleshy; lobes slightly emarginate. *Ovary* of 2 carpels, villous above, rounded; style slender, gradually enlarged; stigma columnar, obscurely angled, with a short spreading ring below and conical point. *Follicles* 8 to 9 in. long, .25 in. broad, somewhat flattened, divergent at about right angles and curved inwards to an acute tip; pericarp scabrous-puberulous,

dark brown with a reddish tinge. *Seeds* oblong, .7 to .8 in. long, .2 in. broad, acute at base, slightly narrowed above and then broadening below the 1 to 1.5 in. long white-silky persistent coma; testa thin, dark brown; albumen moderate; cotyledons lanceolate, .5 to .6 in. long, .1 in. broad; radicle short.

PENANG: at Balick Pulau, *Curtis* 838. PERAK: *King's Collector* 5194.

We have been a good deal in doubt of the genus of this species; in the Kew Herbarium it was placed with *Chonemorpha*, but the comparatively small flowers and different seeds distinguish it from that genus; in some respects it comes most nearly to *Epigynum*, but on the whole we prefer to keep it where we first placed it in *Trachelospermum*, to which genus it seems to us to come most near, especially in the characters of the inflorescence and the fruit. There is in the Kew Herbarium a species (unnamed) which approaches very near to this. It has been sent from the Khasia Hills (*Hook. f. and Th.*); from Manipur (*Watt* 7272); and from Yunan (*Henry* 12136). When it comes to be described with full material, it is by no means unlikely that the two will be found to require a new genus.

### 30. EPIGYNUM, Wight.

Climbing shrubs. *Leaves* opposite, penninerved, the nerves arching. *Flowers* canescent-tomentose, in dense subcapitate corymbose or paniculate leafy cymes at the ends of the branches. *Calyx* small, 5-fid; the lobes narrow, eglandular or with few glands. *Corolla* hypocrateriform; the tube elongate, dilated opposite the stamens; the throat villous, without scales; lobes 5, twisted to the left or nearly erect, overlapping to the right. *Stamens* inserted below the middle of the tube, included; filaments short; anthers linear-sagittate, acuminate, connivent around the stigma and hardly adhering to it; cells spurred at the base. *Disk* fleshy, 5-lobed, lining the calyx-tube. *Ovary* of 2 distinct carpels, dorsally adnate to the disk and surmounted by it; style filiform; stigma cylindric, with annular base and conical tip; ovules many in each carpel. *Fruit* of two linear terete distinct follicular mericarps sometimes torulose. *Seeds* elongate, compressed, broad at the tip and crowned with a thick coma of silky hairs; testa very thin; albumen moderate or scanty; cotyledons oblong, narrow, foliaceous; radicle short, superior.—DISTRIB. Malay Peninsula and Archipelago; about 4 to 5 species.

Leaves elliptic; main nerves 6 to 7 pairs, straight at first:—

- |   |                          |
|---|--------------------------|
| Leaves glabrous beneath except for tufts in the nerve-axils;<br>corolla-tube grey-tomentose without .. .. | 1. <i>E. perakense</i> . |
| Leaves tomentose beneath, not tufted in the nerve-axils;<br>corolla-tube tawny-tomentose without .. ..    | 2. <i>E. Maingayi</i> .  |

Leaves lanceolate; main nerves 7 to 8 pairs, curved; corolla-tube greyish-tawny-tomentose:—

- |  |                         |
|--|-------------------------|
| Leaves prominently tawny-villous in the nerve-axils and along<br>the midrib beneath, otherwise glabrous; flower-buds under<br>.75 in. long; corolla-lobes rounded at tip .. .. | 3. <i>E. Curtisii</i> . |
|--|-------------------------|



Leaves not tufted in the nerve axils, sparsely strigose-hirsute beneath; flower-buds over 1 in. long; corolla-lobes squared at tip .. .. . 4. *E. Ridleyi*.

1. *EPIGYNUM PERAKENSE*, King & Gamble, n. sp. A large climbing shrub; branchlets slender, reddish-brown, terete, uppermost and innovations minutely puberulous; nodes ringed. *Leaves* membranous; elliptic or elliptic-oblong, acute or shortly acuminate at apex, acute-cuneate rhomboid or almost rounded at base; glabrous on both surfaces except for tufts of hair in the axils of the main nerves beneath; margins slightly recurved; 2 to 4 in. long, 1.5 to 2.5 in. broad; midrib slender, pale, raised beneath; main nerves 6 to 7 pairs, prominently raised beneath and pale, at from 50° to 70° with the midrib, nearly straight, meeting in a widely looped intramarginal nerve; secondary nerves few; reticulations irregular, scanty, prominent; petiole .25 to .5 in. long, twisted, articulate. *Cymes* terminal or axillary, crowded, grey-tomentose, trichotomous, up to about 1.5 to 2 in. long and broad; peduncles none or short; branch peduncles short; pedicels about .15 in. long; bracts leafy, caducous; bracteoles many, usually 2 to 3 to each pedicel, ovate-acuminate, similar to the calyx-lobes; buds clavate, twisted, .5 to .75 in. long; flowers white. *Calyx* small, lobes ovate-acuminate, .075 in. long, with minute scales at the base. *Corolla*-tube cylindric, dilated below opposite the stamens, .6 to 7 in. long, grey-tomentose without, slightly villous within; throat with tufts of hair between the lobes; lobes .25 in. long, oblong, crenulate, rounded, twisted to the left, glabrous within, glabrous on the upper, tomentose on the lower half without. *Stamens* inserted a little above the base of the tube; filaments short, slender; anthers sagittate-acuminate with long spurs, .15 to .175 in. long. *Disk* annular, 5-lobed, glabrous. *Ovary* of 2 glabrous carpels attached by their backs to the disk and within it; style slender; stigma cylindric, with a spreading ring below and conical tip. *Follicles* 10 to 12 in. long, densely brown-tomentose when young, tawny-puberulous when old, divaricate at about a right angle, torulose, the swellings opposite the seeds nearly .25 in. in diam., between them about .1 in.; pericarp chartaceous, thin. *Seeds* slender, fusiform, 1 in. long, flattened, gradually broadening upwards to an oblique tip, and furnished with a 1 in. long white silky coma; testa thin, scabrous; cotyledons narrowly linear-oblong, .25 in. long; radicle very small, .05 in. long.

PERAK: *Wray* 1802, 1946, 2365, 4267; *Scortechini* 1474; *King's Collector* 1971, 2324.

This species comes near to *E. Griffithianum*, Wt., but has rather different more acuminate leaves with pale nerves when dry, and larger flowers not so villous within.



2. *EPIGYNUM MAINGAYI*, Hook. f. in Fl. Br. Ind. III. 666 (1882). A climbing shrub; branchlets slender with ferruginous tomentum. *Leaves* membranous; elliptic, acute both at apex and at base; glabrous or minutely puberulous on the upper, yellowish-brown-tomentose on the lower surface; margin slightly recurved; 3·5 to 4·5 in. long, 1·5 to 2·5 in. broad; midrib stout, prominently raised beneath; main nerves 6 to 7 pairs, at about 60° with the midrib, at first nearly straight, then slightly curving to join an intramarginal looped nerve; secondary nerves few, inconspicuous as are the rather distant reticulations; petiole ·25 in. long, tawny-tomentose. *Cymes* terminal or axillary, trichotomous, tawny-tomentose, reaching about 3 in. in length and 2 in. in breadth; peduncles 1 to 1·5 in. long; main branch peduncles ·5 to ·75 in. long, cymules paniculate; pedicels ·2 to ·3 in. long, stout; bracts leafy, deciduous; bracteoles ovate-acuminate, ·075 to ·1 in. long, 3 to each pedicel; buds clavate, whitish-brown-tomentose, ·5 to ·75 in. long; flowers white. *Calyx* small; lobes ovate-acuminate, ·1 in. long, each with about 3 subulate pubescent scales at the base within. *Corolla*-tube cylindric, tawny-tomentose, slightly dilated below opposite the stamens, gradually enlarged above, with 5 villous longitudinal lines within, ·6 to ·7 in. long; throat with tufts of hair between the lobes; lobes oblong, crenulate, rounded, twisted to the left, glabrous within, glabrous on one half and tomentose on the other half without. *Stamens* inserted a little above the base of the tube; filaments slender; anthers very narrowly sagittate, long-acuminate above and with spurs as long below, ·175 in. long in all. *Disk* annular, faintly undulate on the margin, glabrous. *Ovary* of 2 glabrous carpels attached to the disk at their backs and within it; style slender; stigma slender, cylindric, ·1 in. long, with a spreading ring below and conical point above. *Follicles* 6 to 8 in. long, ·15 to ·25 in. broad, slender, cylindric, flexuous, rusty-tomentose. *Seeds* fusiform, pubescent, compressed, ·6 to ·7 in. long, obliquely truncate at top and crowned with a coma of white silky hairs.

PERAK: in open bamboo forests, 400 to 600 ft., *King's Collector* 8734. MALACCA: *Maingay* (K.D.) 1088. SELANGOR: at Kwala Lumpur, *Ridley*.

3. *EPIGYNUM CURTISII*, King & Gamble, n. sp. A climbing shrub; branchlets slender, terete, uppermost and innovations puberulous. *Leaves* membranous; lanceolate, acuminate at apex, attenuate and finally rounded at base; glabrous above, glabrous beneath except along the midrib and for the large hairy tufts in the axils of the main nerves; margins slightly recurved; 3·5 to 4·5 in. long, 1 to 1·5 in. broad; midrib slender, raised beneath; main nerves 7 to 8 pairs, at an angle of 60°

with the midrib, curving upwards and branching to form an obscure intramarginal looped nerve; secondary nerves not conspicuous; reticulations irregular, prominent beneath; petiole .25 in. long. *Cymes* terminal and axillary, pubescent, paniculate, few- (20- to 25-) flowered, reaching 3 to 3.5 in. long and about 1.5 in. broad; peduncles none or short, as are the branches; pedicels .15 to .2 in. long; bracts leafy, persistent; bracteoles ovate-acute, small, 1 to 2 at the base of each pedicel; buds elongate-clavate, .5 to .75 in. long; flowers white. *Calyx*-tube .05 in. long; lobes ovate-acuminate, reflexed, with 1 or 2 small scales at base within. *Corolla*-tube cylindric, slightly dilated below opposite the stamens, greyish-tawny-tomentose without and with pubescent lines within, .6 in. long; throat with a villous ring; lobes obovate, .3 in. long, twisted slightly to left in flower, more so in bud, glabrous within, glabrous without on upper, pubescent on lower half which is exposed in bud. *Stamens* inserted a little above the base of the tube; filaments slender; anthers narrowly sagittate, long-acuminate, .175 in. long; spurs long and slender. *Disk* annular, shortly lobed. *Ovary* of 2 glabrous carpels attached by their backs to the disk and within it; style slender; stigma conical, .075 in. long, with a spreading ring below. *Fruit* not seen.

PENANG: on the road to Penara Bukit, at 2000 ft., *Curtis* 2441.

4. *EPIGYNUM RIDLEYI*, King & Gamble, n. sp. A slender climber; branchlets brown, terete, uppermost parts tawny-pubescent, nodes slightly raised. *Leaves* chartaceous; lanceolate or elliptic-lanceolate, acuminate at apex, attenuate at base; glabrous on the upper surface, sparsely strigosely-hirsute on the lower, especially on the nerves; margin slightly recurved; 2 to 4 in. long, 1 to 1.5 in. broad; midrib slender but prominent; main nerves 8 to 10 pairs, at an angle of about 60° with the midrib, nearly straight to meet a looped intramarginal nerve; secondary nerves irregular; reticulations few, transverse; petiole slender, .25 to .5 in. long, pubescent, channelled above. *Cymes* terminal, densely rusty-villous; the branches sessile or pedunculate, few-flowered (7 to 8), trichotomous; bracts leafy, the lowest similar to the leaves, the succeeding ones smaller by degrees; bracteoles minute, ovate-acute, on the short (.2 to .3 in. long) pedicels; buds very slender with narrowly conical tips, 1.5 to 1.75 in. long, densely pubescent; flowers white. *Calyx*-tube short; lobes ovate, acuminate, villous without, glabrous within, .15 in. long; scales none or very minute. *Corolla*-tube very slender, enlarged below opposite the stamens, gradually widening above, 1 to 1.5 in. long; rusty-villous without, also in vertical lines within, otherwise glabrous; lobes rhomboid, crenate, glabrous except the lower part outside which is exposed in bud, .25 to .3 in. long, twisted slightly

to the left. *Stamens* inserted a little above the base of the tube; filaments .15 in. long, flattened, puberulous; anthers sagittate, .25 in. long, with a membranous tip and long basal spurs. *Disk* 5-lobed; lobes sparsely long hirsute. *Ovary* of 2 glabrous carpels within the disk; style slender; stigma long cylindric, with a spreading fimbriate ring below and conical tip. *Fruit* not known.

PERAK: at Rawang, *Ridley* 7567.

The following species is here described as likely to be eventually found in the Peninsula:—

EPIGYNUM FORBESII, King & Gamble, n. sp. A climbing shrub; branchlets slender, terete, uppermost minutely puberulous. *Leaves* chartaceous; elliptic or elliptic-oblong, acute or shortly acuminate at apex, cuneate at base; glabrous or with scattered hairs above, glabrous beneath; 3.5 to 5.5 in. long, 1 to 2.5 in. broad: midrib slender, prominent beneath; main nerves 8 to 10 pairs, arching upwards to and along the margin and meeting in an intramarginal looped nerve, raised beneath; secondary nerves many; reticulations distant, irregular; petiole .2 to .4 in. long, twisted. *Cymes* terminal and axillary, about 20-flowered, congested, tawny-tomentose, sessile or very shortly peduncled; bracts leafy; bracteoles small, ovate-acuminate, 2 to 3 at the bases of the .1 in. long pedicels; buds clavate with large conical heads; flowers white. *Calyx*-lobes ovate-acuminate, .1 to .15 in. long, eglandular. *Corolla*-tube slender, cylindric, dilated below opposite the stamens, often twisted, 1 in. long; lobes spathulate, crenulate, glabrous except the part exposed in the bud, twisted to the left, .6 in. long. *Stamens* inserted a little above the base; filaments short, slender; anthers narrowly sagittate, acuminate. *Disk* glabrous, 5-lobed. *Ovary* of 2 glabrous carpels adnate to the disk; style slender; stigma cylindric, with a spreading ring below and conical tip. *Fruit* not seen.

SUMATRA: near Bijin Telok, 500 ft., *Forbes* 3236. Haviland's No. 3048 from Kuching, Borneo, resembles this very closely, but has the leaves more lanceolate and longer acuminate.

### 31. MICRECHITES, Miq.

Large climbing shrubs with pubescent inflorescence, otherwise glabrous. *Leaves* opposite, penninerved. *Flowers* small, in axillary and terminal dichotomous thyrsoid or brachiate paniced cymes. *Calyx* small, deeply 5-fid or 5-partite, with obtuse lobes, many-glandular within. *Corolla* subhypocrateriform; the tube ovoid-campanulate, naked at the mouth; lobes 5 falcate, very oblique, sometimes forked, the upper half deflexed in bud, overlapping to the right. *Stamens* inserted near the bottom of the tube, included; filaments short; anthers sagittate, conniving round and adhering to the stigma; cells produced at the base into empty spurs. *Disk* annular or cupular, entire or 5-lobed. *Ovary* of 2 distinct carpels, longer than the disk; style short; stigma ovoid or oblong, with a short obtuse apiculus; ovules very many. *Fruit* of 2 divaricate, thick, subterete, follicular mericarps. *Seeds* generally few, linear-oblong, compressed, not beaked, with a terminal persistent coma;



albumen scanty; cotyledons narrowly linear, elongate; radicle very short.—DISTRIB. India and Malaya, about 4 species.

Leaves almost coriaceous, broad; inflorescence many-branched, many-flowered; corolla-lobes short, often forked, reflexed .. 1. *M. polyantha*.

Leaves chartaceous, narrow; inflorescence scarcely branched, very few-flowered; corolla-lobes long, not forked, spreading .. 2. *M. elliptica*  
var. *Scortechinii*.

1. *MICRECHITES POLYANTHA*, Miq. Fl. Ind. Bat. II. 457 (1856). A slender climbing shrub; branches obscurely angled; branchlets dark brown, terete; innovations sparsely pubescent. *Leaves* chartaceo-coriaceous; elliptic-obovate elliptic-oblong or oblong-lanceolate, obtuse or obtusely acuminate at apex, cuneate attenuate or sometimes slightly rounded at base; glabrous on both surfaces; 2 to 4·5 in. long, 1 to 2 in. broad; midrib stout, prominent beneath; main nerves 10 to 15 pairs, slender, at an angle of 60° to 70° with the midrib, nearly straight to join in an obscure intramarginal nerve; secondary nerves many, similar to and between but more slender than the main nerves; reticulations very oblique; petiole ·5 to 1 in. long, channelled above, often twisted. *Cymes* terminal and axillary, thyrsoïd, rusty-tomentose, much branched, at length often elongating in slender bracteolate racemes, reaching 5 to 7 in. in length and 3 in. in breadth; rachises angular or flattened; peduncle 0 to 2 in. long; pedicels very short and stout, ·05 to ·1 in. long; bracts lanceolate, caducous; bracteoles very many, persistent, ovate, acute or obtuse, conspicuous especially after the fall of the flowers; buds ovoid or conical; flowers white. *Calyx* campanulate; lobes ovate, rounded, rusty-tomentose without, glabrous within, ·05 to ·15 in. long; the base inside furnished with minute scales mixed with villous hairs. *Corolla* campanulate or urceolate, ·15 to ·2 in. long, contracted at the mouth, glabrous without, puberulous within; lobes falcately lanceolate with a knee at the base, or bilobed, the divisions unequal, much reflexed, pubescent at the mouth, ·05 to ·125 in. long. *Anthers* acuminate. *Ovary* densely villous. *Follicles* terete, cylindric, 6 to 12 in. long, divergent at about 120° and curving upwards so as nearly or quite to meet again, acuminate at tip; pericarp thin, dark brown, glabrous. *Seeds* linear-oblong, narrow, compressed, 1 to 1·5 in. long, somewhat enlarged at the apex and furnished with a thick, close, persistent, tawny coma 2 in. long; testa thin, dark brown; albumen scanty; cotyledons linear, very slender, 1 in. long; radicle minute. Hook. f. Fl. Br. Ind. III. 671. *Tabernaemontana polyantha*, Blume Bijl. 1029; A. DC., Prodr. VIII. 376.

PENANG: *Curtis* 850; *Ridley* 9426. PERAK: *Ridley* 2896; *Wray* 1815, 2604; *King's Collector* 4430, 5875, 6564, 6840, 8404, 8859, 10003.



SELANGOR: *Ridley* 7412. MALACCA: *Maingay* (K.D.) 1081.—DISTRIB. Andaman Islands, Java.

Some of the specimens examined differ in the size of the flowers; in the inflorescence, and in the greater or less bifurcation of the corolla-lobes, but we have not succeeded in separating any of them as species or even varieties, and prefer to consider them all as forms of one.

2. *MICRECHITES ELLIPTICA*, Hook. f. Fl. Br. Ind. III. 671 (1882). *Rhyncospermum* 4, Herb. Ind. Or. Hook. f. & Th.

India in Sikkim Himalaya at 4000 to 6000 ft., and Khasia Hills at 3000 to 4000 ft.

VAR. *Scortechinii*, King & Gamble. A climbing shrub. *Leaves* chartaceous; lanceolate, obtusely long-acuminate at apex, cuneate at base; glabrous on both surfaces; 3 to 3·5 in. long, 1 to 1·5 in. broad; main nerves 10 to 12, very slender, not conspicuous; secondary nerves many; reticulations oblique; petiole ·25 in. long. *Cymes* terminal or axillary, very few-flowered, scarcely reaching 1 to 1·5 in. long, minutely puberulous; pedicels slender, ·2 in. long; bracteoles ovate, persistent; buds ovoid, obtuse. *Calyx*-lobes ovate, ciliate, rounded, ·075 in. long. *Corolla*-tube cylindric, ·1 in. long, constricted slightly at the mouth; lobes linear-oblong, ·15 in. long, twisted, glabrous, much turned to the left. *Anthers* sagittate, acuminate; filaments very short. *Ovary* densely villous. *Fruit* not known.

PERAK: *Scortechinii*.

This may prove, when better specimens are available, to be incapable of separation from the Indian type.

#### Family LXXVI. ASCLEPIADACEÆ.

Herbs or shrubs, erect or more usually twining, often with a tuberous rootstock or fleshy roots; juice milky or watery; stems simple or branched, usually woody, sometimes succulent. *Leaves* opposite or whorled, sometimes wanting, very rarely alternate; thin or fleshy, quite entire, sometimes with an interpetiolar stipular line or teeth. *Flowers* hermaphrodite, very variable in size and form but always regular; solitary or few or many together, in umbels, umbel-like cymes, fascicles or racemes, axillary, lateral between the bases of the leaves or terminal. *Calyx* inferior, of 5 sepals or 5-lobed; lobes imbricate, usually with minute glandular scales at the base within. *Corolla* hypogynous, gamopetalous, regular, 5-lobed, various in shape; tube usually short (long in *Ceropegia*), sometimes furnished within or at its mouth with variously shaped processes forming a *corolline corona*; lobes imbricate, contorted or valvate in æstivation, often recurved, sometimes more or less erect and connate at their tips. *Stamens* 5, inserted at or near the base of the corolla and alternate with its lobes, rarely higher up; filaments some-

times free, more usually connate in a tube around the ovary, forming with the anthers and their terminal appendages a *staminal column*, with the apex often united to the dilated part of the style, usually with more or less fleshy processes on the back forming a *staminal corona*; anthers free or united to the dilated part of the style, 2-celled; the cells dehiscing by apical longitudinal or transverse slits; the margins of the anthers or their basal prolongations below the cells more or less horny and wing-like (the *anther-wings*), usually projecting outwards; the adjacent wings of each pair of anthers nearly meeting and forming between them very narrow fissures leading to the stigmatic cavities; connectives of the anthers often produced into membranous rarely fleshy or inflated terminal appendages which are sometimes connate; pollen-contents of each anther-cell granular or united into one or two waxy masses (*pollen-masses*) formed of an indefinite number of pollen-grains and attached in pairs or in fours, sometimes directly but more usually by means of arm-like *caudicles* to each of the 5 small, usually horny, turgid or bilobed *pollen-carriers*, which rest one on each of the 5 angles of the dilated part of the style, the whole forming the *pollinia*, the masses attached to each pollen-carrier always being derived from the cells of two different but adjacent anthers; when granular, each granule is formed of about 4 pollen-grains united together, and, on the dehiscence of the anthers, the whole is loosely contained in the horny spoon-, trumpet-, or trowel-like or bifid *appendicle* tapering downwards into a short or long *caudicle* attached to a soft (adhesive?) pollen-carrier gland. *Ovary* superior, of 2 one-celled, many-ovuled, carpels, free below; the styles united above and dilated into a pentagonal disk (*style-apex*) which is flat or depressed in the centre, with or without a conical or otherwise shaped tip, and bears on its angles the pollen-carriers and immediately beneath them, behind the fissures between the anther-wings, the 5 stigmatic cavities; ovules usually numerous, rarely few or solitary, anatropous, pendulous, imbricate in several series on the projecting placenta. *Fruit* of 2 (or 1 by suppression) divaricate or parallel follicular mericarps, dehiscing by the ventral suture and usually liberating the placenta; pericarp usually smooth, sometimes echinate or winged. *Seeds* usually flat, sometimes ovoid or cylindric, usually with a broad or narrow margin, generally crowned with a *coma* of long silky hairs, sometimes fringed, sometimes without any tuft; testa thin or thick; albumen usually thin, sometimes rather thick, sometimes none; embryo large, nearly or quite filling the seed; cotyledons flat; radicle usually cylindric, superior. — **DISTRIB.** A large Family of more than 1800 species, widely distributed over tropical and subtropical, with a few in temperate, regions.

As in the Family *APOCYNACEÆ*, in which we were much assisted by Dr. O. Stapf's account of it in the 'Flora of Tropical Africa,' Vol. IV. Sect. 1, so in *ASCLEPIADACEÆ* we have been indebted to that by Mr. N. E. Brown in the same work, which has helped us properly to understand the morphology of a very difficult but most interesting Family of plants. We wish also to mention that much assistance was derived from the account of the Family and its Western India genera given by Dr. T. Cooke, C.I.E., in Vol. II. of his 'Flora of the Presidency of Bombay.'

# ANALYSIS OF THE TRIBES.

- Pollen granular, loosely contained in the more or less spathulate or bifid appendices, not attached to the latter .. I. *PERIPLOCEÆ*.  
 Pollen united into very minute waxy masses, 4 or 2 of which are sessile upon a very minute quadrate pale-coloured pollen-carrier .. II. *SECAMONEÆ*.  
 Pollen united in waxy opaque masses without pellucid margin, usually of fair size and attached in pairs by caudicles to the dark-coloured pollen-carriers :—  
     Pollen-masses pendulous .. .. III. *CYNANCHEÆ*.  
     Pollen-masses erect or horizontal, very rarely pendulous .. IV. *MARSDENIÆ*.  
 Pollen united in waxy masses pellucid on one margin or at the apex, and attached in pairs by caudicles to the pollen-carriers V. *CEROPEGIÆ*.

## Tribe I. *PERIPLOCEÆ*.

Filaments of the stamens free; anthers acute or with the connectives produced in terminal appendages connivent over the style-apex and frequently connate. Pollen-contents of each anther-cell of numerous loose granules, each granule formed of 3 to 4 pollen-grains united in lines or tetrads. Appendices spathulate, trumpet-shaped or trowel-shaped, sometimes bipartite, horny, attached by short or long caudicles to an adhesive pollen-carrier gland at the base, which is itself attached to the angles of the style-apex, holding the pollen-granules loosely but not attached to them.

Corona-processes none :—

Anthers with long appendages; climbers :—

    Anther appendages erect, thick, curving inwards at tip .. 1. *PHYLLANTHERA*.

    Anther appendages erect, bearded, erect at tip .. 2. *PENTANURA*.

Anthers with short appendages curving over the style-apex;

shrubs .. .. 3. *GONGYLOSPERMA*.

Corona-processes 5 :—

Corona-processes short, thick .. .. 4. *HEMIDESMUS*.

Corona-processes filiform, behind the stamens :—

Stamens without alternating glands between the filaments;

corolla-lobes rounded :—

    Follicles short, broad, ribbed; corolla large .. 5. *FINLAYSONIA*.

    Follicles cylindric, narrow, not ribbed; corolla small .. 6. *GYMNANTHERA*.

Stamens with glands between the filaments :—

Corolla-lobes elongate, linear-lanceolate; anther appendages long, narrow .. 7. *ATHERANDRA*.

Corolla-lobes short, ovate; anther appendages short, thick 8. *STREPTOCAULON*.

## 1. PHYLLANTHERA, Blume.

Glabrous climbing shrubs. *Leaves* opposite, with nerves at right angles to the midrib, pale beneath. *Flowers* long-pedicelled, subracemose, reddish, in lax pedunculate cymes from one axil of a pair of leaves. *Calyx* short, 5-fid; lobes ovate; scales 5, alternate with the lobes within, membranous. *Corolla* campanulate-rotate, fleshy, deeply 5-fid, papillose within; lobes suboblique, concave, overlapping to the right. *Corona* none. *Stamens* affixed near the base of the corolla; filaments free; anthers agglutinated with the style-apex, not bearded; appendages erect, thick, naked, curving inwards at the tip. *Pollen* granular, composed of 3 to 4 granules cross-wise adherent; pollen-carriers globose, bearing short slender caudicles ending in obliquely funnel-shaped appendices which carry the pollen-masses. *Style-apex* capitate, obscurely 5-angled. *Fruit* of 2 slender divaricate follicular mericarps. *Seeds* oblong; testa thin, with few silky hairs ending in a tufted long silky coma; albumen thin; cotyledons oblong; radicle cylindric, nearly as long as the cotyledons.—DISTRIB. Species 2, one of the Malay Peninsula, the other of Java.

PHYLLANTHERA PERAKENSIS, King & Gamble, n. sp. A glabrous slender climbing shrub, with thin slender terete branchlets. *Leaves* somewhat fleshy, membranous when dry; oblong or oblong-lanceolate, acuminate at apex, rounded at base; glabrous on both surfaces, the lower pale, almost glaucous; margins recurved; 2·5 to 4 in. long, .75 to 1·25 in. broad; midrib prominent, impressed above, raised beneath; main nerves 8 to 10 pairs at right angles to the midrib, obscure, slender, straight to join an intramarginal looped nerve at the sinus of the loops; secondary nerves very few, between and parallel to the main nerves, very obscure; reticulations not visible; petiole slender, .25 to .5 in. long, slightly thickened below. *Cymes* few-flowered; peduncles slender, up to about .25 in. long; branches usually 2, reaching .5 in. in length, subracemose, with pairs of persistent small ovate acute scarious bracts; pedicels very slender, about .25 in. long; buds globose; flowers reddish-brown or mottled red and yellow. *Calyx*-lobes ovate, hyaline, .05 in. long; scales .1 to .2 in. long, membranous. *Corolla*-lobes orbicular, imbricate, .2 to .3 in. long, minutely papillose within; tube very short. *Anthers* with appendages .05 to .075 in. long. *Follicles* slender, 6 to 7 in. long, .25 in. broad, the tip hooked inwards, divaricate in one straight line; pericarp smooth, thin, dark brown, striate. *Seeds* many, oblong, ridged on the ventral surface, .3 in. long, .06 in. broad, with a few sparse white hairs and a deciduous silky white spreading coma 1·5 to 2 in. long; testa thin, dark brown; albumen very thin; cotyledons oblong, rather fleshy, .15 in. long, .05 in. broad; radicle cylindric, .1 in. long.



PERAK: at Kota, Wray 2407, 3005; *Scortechini*; at Larút, King's Collector 2059, 2181, 7314.

This species comes very near to the Javanese *P. bifida*, Blume, but the latter has narrower and longer leaves, with very many (20 to 25) pairs of main nerves and many secondary ones with the intramarginal nerve much nearer the margin. The peduncles and branches of the cyme and the pedicels are stouter and longer and the corolla more fleshy. The anthers are similar, but the pollen-carrier appendices are more obliquely funnel-shaped (see t. xxii. in Bl. Mus. Bot. Lugd.-Bat. I.). The only specimen in the Kew Herbarium is "Coll. T. Lobb, India 1868," and may be possibly from the Peninsula. In the Calcutta Herbarium are specimens from Sumatra (*H. O. Forbes* 2436).

## 2. PENTANURA, Blume.

Glabrous climbing shrubs. *Leaves* opposite, with nerves at right angles to the midrib or nearly so. *Flowers* 1 to 3, on bracteate pedunculate racemose cymes in the axils of or opposite to one leaf of the pair. *Calyx* small, 5-fid, with 5 membranous scales alternate with the lobes within. *Corolla* campanulate-rotate, fleshy, deeply 5-fid, papillose within; lobes oblong, concave, overlapping to the right. *Corona* none. *Stamens* affixed near the base of the corolla, the bases distant, geniculate; filaments free; anthers agglutinated with the style-apex, oblong, not bearded; appendages lanceolate, bearded, caudiform, erect at tip. *Pollen* granular, composed of 3 to 4 granules cross-wise adherent pollen-carriers discoid, bearing slender caudicles and spathulate often truncate appendices which carry the pollen-masses. *Style-apex* capitate, sharply 5-angled. *Fruit* of 2 slender divaricate follicular mericarps. *Seeds* oblong, with few silky hairs ending in a tufted long silky coma; testa thin; albumen thin; cotyledons oblong; radicle cylindric.—**DISTRIB.** Species 2, one of the Khasia Hills and Yunnan, the other of the Malay Peninsula and Archipelago.

This genus comes very near to *Phyllanthera*, with which we are inclined to think it might be incorporated. It differs in the markedly pentagonal style-apex, the bearded anther appendages, and the spathulate not funnel-shaped appendices of the pollen-carriers. *P. khasiana*, Kurz, Fl. Br. Ind. IV. 4, hardly seems to us to belong to this genus.

PENTANURA SUMATRANA, Blume Mus. Bot. Lugd.-Bat. I. 125, t. xxi. (1849). A glabrous slender climbing shrub, with thin angled or striate branchlets, bearing occasional round lenticels. *Leaves* chartaceous; elliptic, rather abruptly acuminate at apex, cuneate at base; glabrous on both surfaces, the lower pale, almost glaucous; the margins strongly recurved; 3 to 4 in. long, 1.25 to 1.75 in. broad; midrib slender, slightly impressed above, raised beneath; main nerves 7 to 8 pairs, slightly raised beneath, at or a little less than right angles with

the midrib, straight to join an intramarginal looped nerve; secondary nerves few, very faint; reticulations not visible; petiole .25 in. long, channelled above, sometimes bearing small stipular glands at the base. *Racemes* up to 2 in. long, 1- to 3-flowered, with pairs of persistent ovate scarious bracts; pedicels slender, .15 in. long; buds ovoid, acute; flowers deep red. *Calyx*-lobes ovate, acute, hyaline, .1 in. long, with ovate acute membranous scales .03 in. long between each at the base within. *Corolla*-lobes oblong or obovate-oblong, .5 in. long by .3 in. broad, minutely papillose within; tube salver-shaped at base. *Appendages* of stamens erect, bearded, about .03 in. long; appendices of pollen-carriers as long. *Follicles* slender, 5 to 6 in. long, .2 in. broad, very acute, divaricate in a straight line, tips straight; pericarp thin, rough, striate, dark brown. *Seeds* many, oblong, ridged on the ventral surface, .275 in. long, .075 in. broad, with a few sparse white curly hairs and a deciduous silky white spreading coma about 1.5 in. long; testa thin, dark brown; albumen thin; cotyledons oblong .15 in. long by .05 in. broad; radicle cylindric, .1 in. long. Miq. Fl. Ind. Bat. II. 471; Engl. & Prantl Naturl. Pflanzenfam. IV. 2, 211, fig. 63, D.E.

PERAK: at Relau Tujur, Wray 1847, 4025; *Scortechini* 1303; *King's Collector* 1825, 3514.—DISTRIB. Sumatra (*Prætorius*, *Beccari* 640).

### 3. GONGYLOSPERMA, King & Gamble, nov. gen.

A shrub. *Leaves* opposite, strongly nerved. *Flowers* in axillary or pseudo-terminal, bracteate, paniculate cymes; the branches 2- to 3-chotomous; pedicels slender. *Calyx* short, 5-partite: scales combined in a ring. *Corolla* rotate-campanulate; the tube short; lobes oblong, overlapping to the right. *Corona* none. *Stamens* inserted on the corolla-tube; filaments free, broad and nearly confluent at base; anthers short; appendages short, triangular, incurved over the style-apex; pollen-granules elongate, of 3 to 4 pollen-grains in one line; pollen-carriers minute, appendices spatulate. *Ovary* of 2 carpels; styles distinct below, combined above; style-apex obscurely 5-angled, flattened at top. *Fruit* of 2 short divaricate oblong follicular mericarps; pericarp thin, pubescent. *Seeds* very small, oblong-cylindric, with a white silky coma; albumen copious; cotyledons fleshy; radicle cylindric.—DISTRIB. A single species only as so far known.

GONGYLOSPERMA CURTISII, King & Gamble, n. sp. A small shrub; branches smooth, brown. *Leaves* coriaceous; lanceolate or oblong-lanceolate, acute at apex, attenuate at base; both surfaces rugose, the upper slightly puberulous, the lower pubescent, both ashy grey, the lower much the paler; margins recurved; 2.5 to 4.5 in. long, .75 to 1.75

in. broad; midrib as well as all nerves and reticulations impressed above, raised beneath; midrib thick; main nerves stout, 18 to 20 pairs, at about  $60^{\circ}$  with the midrib, nearly straight to join an obscure intra-marginal looped nerve close to the margin; secondary nerves few; reticulations closely netted; petiole rather stout, .15 to .25 in. long. *Cymes* more or less grey-puberulous, reaching 1.5 in. long and 2 in. broad; peduncle stout, .25 to .5 in. long; branches 3-chotomous secondary branches again 3-chotomous, both furnished with pairs of small ovate acute bracts; pedicels slender, .15 in. long; buds ovoid, acute. *Calyx* short; tube very short; lobes ovate, acute, hyaline on the margins, glandular dotted; scale-ring narrow. *Corolla*-tube short, lobes oblong, blunt, .15 in. long. *Corona* none. *Stamens* few; filaments rather thick, enlarged and almost confluent at the base; anthers short, rounded; appendages triangular, black, curved over the style-apex and connate. *Styles* short, stout; style-apex obscurely 5-angled, flattened at top. *Follicles* straight, thick, 1 to 1.25 in. long, .25 in. broad, divaricate in a straight line, tip slightly incurved, blunt; pericarp thin, minutely grey-pubescent. *Seeds* oblong-cylindric, .1 in. long and .05 in. thick, ending in a sparse white silky coma .2 in. long; testa granular, very thin; albumen copious; cotyledons elliptic, fleshy, .06 in. long; radicle cylindric, a little shorter than the cotyledons.

SIAM STATES: at Poongah, in the crevices of limestone rocks. *Curtis* 2951.

#### 4. HEMIDESMUS, Br.

Twining shrubs. *Leaves* opposite or in whorls of 4. *Flowers* small, greenish-purple, in opposite crowded subsessile cymes. *Calyx* 5-partite; lobes acuminate; with 5 minute scales between them at their bases within. *Corolla* rotate, deeply 5-fid, with valvate fleshy lobes; tube very short. *Corona*-processes 5, short, thick, on the throat of the corolla and alternate with its lobes. *Stamens* inserted at the base of the corolla-tube; filaments distinct or subconnate at the base; anthers small, cohering at the apex, terminated by inflexed appendages; pollen-masses cohering in pairs in each cell, granular; the caudicles of the pollen-carriers thick below, then slender, bearing cucullate or spreading appendicles. *Style-apex* 5-lobed, flat on the top. *Fruit* of 2 slender divaricate terete follicular mericarps. *Seeds* oblong, flattened, ridged on the ventral face, ending in a broad tip bearing a long silky coma; albumen scanty; cotyledons oblong, fleshy; radicle cylindric.—  
DISTRIB. India and Malaya; species 1 or 2.

HEMIDESMUS INDICUS, Br. in Mem. Wern. Soc. Edinb. I. 57 (1811). A prostrate or twining shrub, with slender terete branchlets; older branches dark brown, with prominent wart-like lenticels. *Leaves* chartaceous, very variable, in pairs or whorls of 4, of which one pair shorter than the other; elliptic-oblong to linear-lanceolate, acute or mucronate at apex, rounded at base; glabrous on both surfaces, the upper sometimes variegated with white, the lower often pale; margins recurved; 2 to 4 in. long, .5 to .75 in. broad (our specimen); midrib slender, raised beneath or flattened; main nerves 4 to 5 pairs, curving upwards and meeting near the margin; reticulations obscure; petiole .15 to .25 in. long, slender. *Cymes* opposite, on very short peduncles; flowers on short pedicels with many ovate-acute bracts. *Calyx*-lobes ovate-acute, membranous, .05 in. long; scales minute. *Corolla*-lobes ovate-oblong, acute; tips incurved; .15 to .25 in. long. *Corona*-scales often emarginate. *Follicles* cylindric, 4 to 7 in. long, spreading at 180° apart or slightly curved backwards from the straight line; tips slightly hooked; pericarp thin, smooth. *Seeds* ovate-oblong, flattened, ridged on the ventral face; testa granulate on one side and the margin, smooth on the other; cotyledons oblong; radicle slightly shorter than cotyledons. Wall. Cat. 8243; Wight Contrib. 63, Ic. t. 594; Deless. Ic. Sel. V. t. 55; Dene. in DC. Prodr. VIII. 494; Miq. Fl. Ind. Bat. II. 465; Benth. & Trim. Med. Pl. t. 174; Hook. f. Fl. Br. Ind. IV. 5; Trimen Fl. Ceyl. III. 144; Cooke Fl. Bomb. II. 147; Prain Beng. Plants 686; Engl. & Prantl Naturl. Pflanzenfam. IV. 2, 218, fig. 63, H. J. *H. Wallichii*, Miq. Pl. Hohenack. No. 359. *Periploca indica*, Willd. Sp. Pl. I. 1251. *Asclepias pseudo-sarsa*, Roxb. Hort. Beng. 20, and Fl. Ind. II. 39, *excl. syn.*—Burm. Thes. Zeyl. t. 83, fig. 1. "*Naru-nundi*," Rheede Hort. Mal. X. t. 34.

DINDINGS: at Bruas Road, *Curtis*.—DISTRIB. India, Ceylon.

The only specimen available was a very poor one with only one or two nearly rotten flowers, but there seems no reason to doubt its identification.

##### 5. FINLAYSONIA, Wall.

A lofty glabrous climbing shrub with milky juice. *Leaves* opposite. *Flowers* in 2- to 3-chotomous axillary cymes, moderate-sized, yellowish and purple. *Calyx* short, 5-partite. *Corolla* rotate, deeply 5-fid; the lobes broad, ovate, overlapping to the right. *Corona*-processes 5, filiform, close behind the stamens. *Stamens* inserted at the throat of the corolla; filaments slender; anthers adnate to the style-apex by the middle, ending in broad inflexed membranous acute appendages; pollen-masses cohering in pairs in each cell; pollen granular; pollen-



carriers glandular, attached to the angles of the style-apex; appendices slender, dilated above in a small rounded apex. *Style* slender; style-apex large, fleshy, truncate and 5-angled at base, convexly conical above. *Fruit* of 1 or 2 divaricate, fleshy, broad, follicular mericarps; the sides with 1 to 4 longitudinal ribs; the tip incurved. *Seeds* lax, flattened, ovate, with short rufous hairs at the margins, coma none; testa thin; albumen scanty; cotyledons broadly oblong, fleshy; radicle short, stout.—DISTRIB. India and Malaya; 1 species.

FINLAYSONIA OBOVATA, Wall. Pl. As. Rar. II. 48, t. 162 (1831), and Cat. 4466A. A lofty glabrous climbing shrub with milky juice; branches stout, obtusely angular, with pale brown papery, lenticellate bark. *Leaves* coriaceous; obovate, obtuse or shortly apiculate at apex, cuneate at base; both surfaces glabrous, the lower glaucescent; margins slightly recurved; 3 to 5 in. long, 1·5 to 2·5 in. broad; midrib broad, slightly impressed above, flattened beneath; main nerves 7 to 9 pairs, at about 70° with the midrib, straight to join in an obscure looped intramarginal nerve; secondary nerves few; reticulations many, indistinct; petiole ·5 to 1 in. long. *Cymes* 2 to 3 in. long; peduncle thick, often reddish, ·75 to 1 in. long; branches divaricate, ·25 to ·5 in. long, usually 3; subsequent branches usually 2, short, stout; pedicels slender, ·15 in. long; bracts ovate, acute, sheathing the bases of the branches; buds ovoid; flowers yellowish with purple markings. *Calyx*-lobes ovate, acute, ciliate, ·05 in. long; scales very minute. *Corolla*-lobes nearly orbicular, spreading, furnished within with long whitish hairs on a part only, glabrous without, ·2 to ·3 in. long. *Corona*-processes flexuose, ·06 in. long. *Follicles* thick, ventricose, about 3 in. long by 2 in. broad, broadest in the middle; tip thick, blunt, hooked; ribs 3 to 4, slightly winged; pericarp thin. *Seeds* ovate, ·7 to ·8 in. long by ·4 in. broad, flat; the margins winged and bordered by a few long, reddish, applied hairs, extending in a short tuft at the tip; testa thin, brown, keeled on the ventral surface; albumen thin; cotyledons oblong, fleshy, ·45 in. long, ·25 in. broad, veined; radicle thick, ·15 in. long. Wight Contrib. 65; Wight Ill. t. 182, fig. 5; Griff. Notul. IV. 70, and Ic. Pl. Asiat. t. 407; Dene. in DC. Prodr. VIII. 494; Miq. Fl. Ind. Bat. II. 464; Hook. f. Fl. Br. Ind. IV. 7; Kurz For. Fl. II. 197; Prain Beng. Plants 686; Engl. & Prantl Naturl. Pflanzenfam. IV. 2, 211, fig. 64, c.d. *Gurua obovata*, Ham. in Voigt Hort. Sub. Calc. 544.

SIAMESE STATES: at Kasoom, *Curtis* 3246. PENANG: at Butterworth, *Curtis* 483. PERAK: *Scortechini* 1104. SELANGOR: among mangroves at Kwala Selangor, *Ridley* 7565. MALACCA: *Maingay* (K.D.) 1104. SINGAPORE: *Ridley*.—DISTRIB. India (Sundarbans), Burma (*Griffith*, *Helper* 3749). A plant of the river deltas.

The description of Wallich is most detailed, and, it may be mentioned here, gives a brief account of Mr. George Finlayson, in whose honour the genus was named.

#### 6. GYMANTHERA, Br.

Glabrous climbing shrubs. *Leaves* opposite. *Flowers* in short axillary peduncled cymes, usually 2-branched; branches racemose pedicels slender. *Calyx* short, 5-partite, with 5 or 10 or more minute membranous scales within at the base. *Corolla* hypocrateriform or rotate; the lobes spreading, overlapping to the right. *Corona*-processes 5, filiform on a broad base, often bifid, affixed to the corolla-tube closely behind the stamens and subconnate with them. *Stamens* inserted in the tube of the corolla; filaments short, slender above, dilated at the base and subconnate; anthers adherent to the style-apex, produced above in acuminate connivent appendages; pollen granular, in several masses in each anther-cell; the granules elongate, of 3 to 4 grains lineally arranged; pollen-carriers large, glandular; caudicles slender, appendices spathulate, carriers attached to the style-apex. *Style* short; style-apex convex, 5-lobed at base. *Fruit* of 2 cylindric divaricate follicular mericarps. *Seed* not known.—DISTRIB. About 5 species: of the Malay Archipelago and tropical Australia.

GYMANTHERA INSULARUM, King & Gamble, n. sp. A climbing shrub; branches woody, thick, rough, with dark brown smooth bark and occasional lenticels. *Leaves* chartaceous; elliptic or elliptic-oblong, rounded with a short acumen at apex, attenuate at base; upper surface dark brown when dry, lower greyish-white, both surfaces glabrous; margins slightly recurved, 2·5 to 3·5 in. long, 1 to 1·5 in. broad; midrib prominent, pale, impressed above, raised beneath; main nerves 12 to 14 pairs, at about 70° with the midrib, slightly curved upwards to join a faint intramarginal looped nerve; secondary nerves faint, short; reticulations netted, impressed above when dry; petiole slender, .5 to .75 in. long, channelled above. *Cymes* puberulous, about as long as the petiole; peduncle short, .2 in. long; branches 2, racemose, with many pairs of minute, ovate, acute bracts; pedicels rather stout, .15 in. long; buds ovoid. *Calyx* very small; lobes scarcely .025 in. long, margins hyaline; scales very small, 5 opposite to and 5 alternate with the lobes. *Corolla*-tube very short; lobes ovate-oblong, acute, .15 to .2 in. long, slightly overlapping to the right, reflexed in flower. *Corona*-processes 5, behind the filaments, bifid; the lobes subulate, inner one the longer, .03 in. long. *Stamens* inserted on the corolla-tube; filaments slender, broadened and connected at base; anthers rounded; connective produced in an acuminate tip; pollen granular, in many masses, each made up of 3 to 4

grains adherent lineally. *Style* short, rather slender; style-apex 5-angled below, convex above. *Fruit* and *seeds* not known.

KEDAH: small islands near Langkawi, *Curtis* 3684.

#### 7. ATHERANDRA, Dene.

Slender glabrous climbing shrubs. *Leaves* opposite. *Flowers* in lax axillary and terminal peduncled dichotomous cymes. *Calyx*-tube turbinate, 5-partite, patent in end; scales 5, quadrate, crenulate. *Corolla* rotate; tube short, narrowed at the base; lobes elongate, slender, linear-lanceolate, overlapping to the right, twisted to the left in end. *Corona*-processes 5, filiform, at the back of the bases of the filaments. *Stamens* inserted at the base of the corolla-tube; filaments free, alternate with erect glands; anthers ovate, subhastate at base, connate with the style-apex; appendages long, acute, membranous, combined in a cone over the style-apex; pollen-carriers of a viscid basal gland attached to the base of the style-apex; appendices oblong-spathulate, bearing many pollen-granules of 4 grains arranged in line or in tetrads. *Ovary* conical, sunk in the calyx-tube; style slender, short; style-apex long, conical, 5-lobed at base. *Fruit* not known.—DISTRIB. One species.

ATHERANDRA ACUTIFOLIA, Dene. in DC. Prodr. VIII. 497 (1844). A slender twining shrub; branchlets dark brown, slightly rough; innovations puberulous. *Leaves* chartaceous when dry; oblong-lanceolate or obovate-oblong, acute or cuspidate at apex, attenuate and then rounded at base; glabrous on both surfaces and reddish or greyish black when dry, dark on the upper, almost glaucous on the lower; margins slightly recurved; 2 to 3.5 in. long, .75 to 1.75 in. broad; midrib slender, raised beneath, sometimes puberulous; main nerves 5 to 8 pairs, very slender, arching upwards to and along the margin; secondary nerves few, reticulations inconspicuous; petiole slender, .2 to .4 in. long. *Cymes* very slender, reaching 3 in. in length and about the same in breadth; peduncles slender, about 1 in. long; branches capillary, nearly as long; bracts in pairs, linear-subulate, .1 to .15 in. long; pedicels capillary, curved, .75 in. long, somewhat enlarged under the calyx; buds conical, acuminate, .5 in. long; flowers few, brownish-yellow, distant. *Calyx*-tube turbinate, with 5 small scales at the throat; lobes spreading, lanceolate, .06 in. long. *Corolla*-tube very short; lobes linear, .75 in. long, twisted in bud to the right, then straight, recurved in flower. *Corona*-processes filiform, nearly 1 in. long, behind the stamens. *Fruit* and *seeds* not known. Miq. Fl. Ind. Bat. II. 467; Hook. f. Fl. Br. Ind. IV. 9. *A. pubescens*, Blume Mus. Bot. Lugd.-Bat. I. 147, t. xxvi; Miq. l.c. 468. *A. cuspidata*, Blume l.c.; Miq. l.c. *Cryptolepis filiformis*, Wall. Cat. 4458.

KEDAH : at Coah, Langkawi Island, *Curtis* 2591. PENANG : *Wallich* 4458.—DISTRIB. Java (*Lobb, &c.*).

In *Curtis*' specimen the glands between the filaments are very small or sometimes none ; but otherwise the specimen agrees well enough with *Wallich*'s.

#### 8. STREPTOCAULON, Wight & Arn.

Twining herbs and shrubs, usually tomentose. *Leaves* opposite. *Flowers* small, often minute, in lax sessile or peduncled trichotomous paniced cymes in one axil only of a pair of leaves. *Calyx* minute, 5-partite, with 5 scales within at the base. *Corolla* rotate ; tube very short ; lobes ovate, slightly overlapping to the right ; buds conical or pyramidal. *Corona*-processes filiform, adnate to the backs of the filaments. *Stamens* inserted at the base of the corolla ; filaments very short, alternating with minute glands ; anthers oblong, adherent to the style-apex ; appendages small, black, triangular, connate over the style-apex ; pollen-carriers of a viscid gland attached to the base of the style-apex ; appendices spathulate-funnel-shaped ; pollen-masses 2 in each anther-cell composed of pollen-granules, each of which consists of 3 to 4 grains arranged in lines or tetrads. *Ovary* of 2 distinct carpels ; style short ; style-apex 5-angled, depressed, top convex. *Fruit* of 2 divaricate follicular mericarps, usually pubescent. *Seeds* flattened, keeled on the ventral surface, oblong ; tip broad, surmounted by a long white silky coma ; testa very thin ; albumen very scanty ; cotyledons ovate-oblong, flat ; radicle cylindric, nearly as long as cotyledons.—DISTRIB. 6 to 7 species, of India and the Malay Peninsula and Archipelago, and the Philippine Islands.

Main nerves of leaf 6 to 8 pairs ; corolla-lobes under .1 in. long ;

follicles under 3 in. long .. .. 1. *S. Wallichii*.

Main nerves of leaf 14 to 18 pairs ; corolla-lobes over .1 in.

long ; follicles over 3 in. long .. .. 2. *S. Griffithii*.

1. STREPTOCAULON WALLICHII, Wight Contrib. 65 (1834). A slender climbing shrub with very milky juice ; branchlets slightly angled, with dark brown bark and occasional small lenticels, uppermost and innovations densely shortly brown-pubescent. *Leaves* subcoriaceous ; elliptic or elliptic-lanceolate, acute with a short apiculus at apex, cuneate at base or occasionally rounded ; upper surface dull brown when dry and puberulous, lower densely and softly brown-tomentose ; margins slightly recurved ; 2 to 5 in. long, 1 to 2.5 in. broad ; midrib slender, slightly impressed above, prominent beneath ; main nerves 6 to 8 pairs, at an angle of about 60° with the midrib, curved gradually upwards to



and along the margin; secondary nerves none; reticulations minutely netted but not prominent; petiole .25 to .5 in. long, channelled above. *Cymes* spreading, much-branched, many-flowered, hispidly pubescent, reaching 1.5 to 2 in. long and 2 to 2.5 in. broad; peduncles usually short, about .25 in. long; branch peduncles .5 in., rest gradually shorter; bracts many, in pairs, small, ovate-acuminate; pedicels slender; buds ovoid-pyramidal; flowers glabrous, reddish. *Calyx*-tube turbinate; lobes ovate-oblong, .025 in. long, often emarginate, hyaline at the edges; scales minute, obtuse. *Corolla*-tube very short, cylindric, then rotate; lobes oblong, .075 in. long, obtuse, tips incurved. *Corona*-processes .03 in. long, tips glandular. *Follicles* slender, 3 in. long, .3 in. broad, divaricate in a straight line, tips slightly hooked; pericarp thin, densely greyish-tomentose. *Seeds* oblong, rounded at base, keeled on the ventral surface, .25 in. long by .05 in. broad, broad at tip and with a thick white silky coma 1 to 1.25 in. long; testa thin, brown, shining; albumen very scanty; cotyledons ovate-oblong, acute, .1 in. long; radicle slender, cylindric. Wall. Cat. 8249B; Dene. in DC. Prodr. VIII. 496; Miq. Fl. Ind. Bat. II. 469; Hook. f. Fl. Br. Ind. IV. 9.

KEDAH: on Lankawi Island, *Ridley* 8295; *Bell in Cantley* 229. KELANTAN: *Ridley* cf. Trans. Linn. Soc., Ser. 2, III. 320. PENANG: *Phillips*; *Maingay* (K.D.) 1100; *Deschamps*; *Stoliczka*; *G. King*; *Curtis* 472, 2122; *Ridley* 9484; *King's Collector* 4910, 5188. PROVINCE WELLESLEY: at Arakuda, *Ridley* 6972. PERAK: *Scortechini*; *King's Collector* 2509; *Ridley* 3072. SINGAPORE: *Wallich* 8249B.

2. STREPTOCAULON GRIFFITHII, Hook. f. Fl. Br. Ind. IV. 10 (1883). A climbing shrub; branchlets dark purplish-brown, pubescent; innovations hispidly tomentose. *Leaves* subcoriaceous; obovate-oblong or oblanceolate, shortly acuminate at apex, narrowed and finally rounded or cordate at base; upper surface greyish and puberulous, lower densely greyish-brown-tomentose; margin slightly reflexed; 3 to 4 in. long, 1 to 2 in. broad; midrib stout beneath, more slender and impressed above; main nerves 14 to 18 pairs, at about 60° with the midrib, at first straight, then curved to and along the margin; secondary nerves none; reticulations minutely netted, the larger ones transverse between the main nerves, all slightly impressed above and raised beneath; petiole .25 in. long. *Cymes* dichotomous, hispidly tomentose, 1 to 2 in. long and broad; peduncle .25 in. long; branches furnished with many pairs of opposite persistent ovate-acute hirsute bracts; petiole slender, .15 in. long; buds ovoid-conic. *Calyx*-tube turbinate; lobes ovate-acute, hirsute without, glabrous within; margins hyaline; scales minute, 2- to 3-fid. *Corolla*-tube very short or none; lobes rotate, ovate-acute, .1 to .15 in. long, glabrous but minutely puncticulate without. *Corona*-

processes filiform, on a conical base in a discoid ring. *Pollen-carrier* appendices broadly linear, bifid. *Follicles* slender, straight, 3 to 4 in. long, .5 in. broad, recurved to about 270°; tips slightly hooked; pericarp chartaceous, minutely pubescent without, smooth within. *Seeds* oblong, contracted above in a short neck, truncate at tip, also at base, keeled on the ventral surface, .3 in. long, .1 in. broad; tip with a dense white silky coma about 1 in. long; testa thin, black; cotyledons ovate, acute, .125 in. long; radicle slender, cylindric .075 in. long. *Streptocaulon*, Griff. Notul. IV. 71, and Ic. Pl. Asiat. t. 406.

JOHORE: at Batu Pahut, *Ridley* 11120.—DISTRIB. Burma (Tenas-serim, *Helper* (K.D.) 3754; Mergui, *Griffith*), Siam (*Schomburgk*), Tonkin.

## Tribe II. SECAMONEÆ.

Filaments of the stamens connate into a tube and adnate at top to the dilated part of the style; appendages of the anthers more or less fimbriate. Pollen-contents of each anther-cell of two very minute distinct waxy masses sometimes combined into one. Pollen-carriers minute, subquadrate, soft; the pollen-masses attached to them in fours or pairs.

Corolla-lobes imbricate, usually glabrous or merely puberulous within:—

Corolla-tube not lined by a toothed membrane; corona thin:—

Corolla-lobes small, overlapping to right or left; style-apex short, rounded, obtuse; pollen-masses in fours on a minute carrier .. .. . 9. SECAMONE.

Corolla-lobes overlapping to left, usually rather large; style-apex elongate, conical or clavate; pollen-masses in pairs (or very obscurely only in fours) on a minute thick carrier. 10. TOXOCARPUS.

Corolla-tube lined by a toothed membrane; corona short, thick .. .. . 11. GONIOTEMMA.

Corolla-lobes valvate, villous within .. .. . 12. GENIANTHUS.

## 9. SECAMONE, Br.

Climbing or straggling shrubs or undershrubs. *Leaves* opposite. *Flowers* small, often minute, in lax axillary sessile or shortly peduncled 2-3-chotomous cymes. *Calyx* 5-partite, without scales within. *Corolla* small, rotate, 5-lobed; lobes overlapping to right or left; tube very short. *Corona*-processes 5, adnate to the staminal-column, compressed. *Stamens* inserted at the base of the corolla; filaments connate at the base only; anther-tips ending in a small inflexed appendage, connivent around the style-apex; pollen-masses very minute, globose or slightly oblong, in pairs in each cell, attached in fours to the minute pollen-carriers, without caudicles. *Ovary* of 2 carpels; style columnar,

dilated, ending in a flattened ring and produced in a beak above it; style-apex rounded or bifid, exerted beyond the anthers. *Fruit* of 2 divaricate follicular mericarps, terete or angular, acuminate, smooth. *Seeds* flattened, oblong, ending in a long white silky coma; albumen scanty; cotyledons linear-oblong; radicle rather long, cylindric.—*DISTRIB.* Species about 30, chiefly of South and Tropical Africa and the Mascarene Islands; a few in India, Malaya, and the islands, extending to Australia.

*SECAMONE MICRANTHA*, Dene. in DC. Prodr. VIII. 501 (1844). A small climbing shrub; branchlets slender, terete, the size of a crow-quill; nodes enlarged. *Leaves* membranous; ovate-lanceolate, acuminate and apiculate at apex, attenuate at base; both surfaces olive-green when dry, the lower paler, glabrous; margins recurved; 1.5 to 3 in. long, .35 to 1 in. broad; midrib slender; main nerves about 8 to 10 pairs, obscure, curving acutely upwards to meet an obscure intramarginal nerve; reticulations scarcely visible; petiole slender, .1 to .25 in. long. *Cymes* spreading, pubescent, 1 to 2 in. long and the same broad; branches usually 2-chotomous below, 3-chotomous above; main peduncle variable, reaching 1 in. long; branch peduncles slender, flexuous, often zigzag, about .25 in. long; pedicels .1 in.; bracts very small, ovate-acute, hispidly hairy; buds globose; flowers pale yellow. *Calyx* deeply cleft, lobes ovate, ciliate on the margins, scarious above, black-gland-dotted on the claw, .05 in. long. *Corolla*-lobes deeply cleft, glabrous, .075 in. long, obtuse, 3-nerved. *Corona*-processes very narrow, compressed, with a rounded tooth on the back. *Follicles* 2, slender, divaricate in a straight line (180°) or nearly so, 3 in. long, .3 in. broad; acuminate tips slightly incurved; pericarp thin, glabrous, striate. *Seeds* ovate-spathulate, truncate at tip, flattened, submembranous on the margins, bearing a copious white silky coma, .5 in. long, .125 in. broad; testa thin, brown, shining. Miq. Fl. Ind. Bat. II. 472. *Tylophora micrantha*, Dene. Herb. Tim. Desc. in Nouv. Ann. Mus. Sc. III. (1834) 377.

*SIAMESE STATES:* Trang, *King's Collector* 1414. *KEDAH:* on Langkawi Island, *Curtis* 2800. *PENANG:* *Curtis* 225, 992, 1896.—*DISTRIB.* Java, Timor.

We cannot separate from this *S. Finlaysonii*, Wight Contrib. 61 (1834); Wall. Arch. No. 103, probably from Siam.

#### 10. TOXOCARPUS, Wight & Arn.

Twining shrubs. *Leaves* opposite. *Flowers* small or moderate-sized, in axillary dichotomous paniculate or racemose cymes. *Calyx* minute, 5-partite, with or without 5 minute scales within at the base.

*Corolla* shortly subrotate or campanulate, 5-fid; tube short or about as long as the lobes; lobes linear-oblong, recurved, overlapping to the left. *Corona*-processes 5, attached to the staminal tube, dorsally flattened, toothed, the tooth usually curving upwards. *Stamens* inserted at the base of the corolla; filaments connate; anthers small, erect or connivent around the style-apex; appendages often minutely fimbriate; pollen-masses very minute, pendulous, single or obscurely in pairs in each cell, attached to minute pale soft pollen-carriers, without caudicles. *Ovary* of 2 carpels; style slender; style-apex columnar or clavate, produced far beyond the anthers; tip often bifid. *Fruit* of 2 divaricate follicular mericarps; pericarp smooth. *Seeds* oblong, flattened, tipped with a silky coma; testa thin; cotyledons oblong; radicle cylindric.—DISTRIB. Species about 20; found in India, Malaya and Tropical Africa.

Corolla-tube much shorter than the lobes:—

Corolla-lobes linear, twisted when open; style-apex long-acuminate:—

Cymes reaching 2 in. in length; leaves more or less elliptic; follicles 12 in. long and slender .. .. 1. *T. Griffithii*.

Cymes scarcely reaching .5 in. long; leaves more or less obovate; follicles linear-lanceolate, .4 in. long .. 2. *T. Curtisii*.

Corolla-lobes obovate-oblong, not twisted; style-apex pyramidal form:— 3. *T. Scortechinii*.

Corolla campanulate; tube longer than lobes:—

Cymes rusty-pubescent, reaching 2 in. long; leaves lanceolate 4. *T. penangianus*.

Cymes pubescent, under 1 in. long; leaves elliptic .. 5. *T. lankawiensis*.

1. *TOXOCARPUS GRIFFITHII*, Dene. in DC. Prodr. VIII. 505 (1844). A slender climbing shrub; branchlets slender, more or less hispid with purplish-brown stiff hairs; nodes swollen. *Leaves* chartaceous; elliptic-oblong or lanceolate, cuspidately acuminate at apex, cuneate at base; both surfaces glabrous except the midrib and main nerves beneath, upper greyish-brown, lower greyish when dry; margins recurved; 2 to 4 in. long, 1 to 2 in. broad; midrib slender, slightly impressed above, raised beneath; main nerves 6 to 7 pairs, curving upwards to and along the margin where they anastomose; secondary nerves few; reticulations irregular, fairly prominent beneath when dry; petiole slender, twisted, .3 to .5 in. long. *Cymes* shorter than the leaves, reaching 2 in. in length, rusty-pubescent; peduncle about .25 in. long; branches 2 to 3, racemosely paniculate; the flowers in small clusters on a somewhat zigzag red rachis; bracts many, persistent, ovate-acute; pedicels very short; buds conical; flowers creamy white. *Calyx* pubescent without; lobes ovate-oblong, .05 in. long. *Corolla*-lobes linear-oblong, glabrous except for slight pubescence near



the base within, .075 in. long, twisted; tube very short. *Corona*-processes adherent to and as long as the staminal tube, the back with a short upturned tooth. *Style-apex* produced, ovate-clavate, acuminate and bifid at tip. *Follicles* 12 in. long, .15 in. broad, very slender, flexuous, slightly torulose; pericarp crustaceous, puberulous. *Seeds* 1 in. long, linear, very slender, obliquely truncate at apex and furnished with a thick coma of silky hairs 1 to 1.25 in. long; testa dark brown, granular; cotyledons oblong, thin. Hook. f. Fl. Br. Ind. IV. 13. *Toxocarpus* sp., Griff. Notul. IV. 69, and Ic. Pl. Asiat. t. 404 (*Asclepiadæ*). *Connaraceæ*, Wall. Cat. 8550.

PENANG: *Porter*. PERAK: at Sungie Larût, *Wray* 2465; in dense jungle on low wet ground near Larût, *King's Collector* (*Kunstler*) 6205. MALACCA: *Maingay* (K.D.) 1105. SINGAPORE: *Lobb* 45.—DISTRIB. Burma (in *Mergui*, *Griffith* 8550; *Helper* 3758).

2. *TOXOCARPUS CURTISII*, King & Gamble, n. sp. A slender climbing shrub; branchlets pustular, dark brown, striate, the uppermost rusty-pubescent, nodes slightly swollen. *Leaves* elliptic or elliptic-obovate, shortly and bluntly acuminate at apex, cuneate at base; both surfaces olive-grey, upper darker and shining, lower sparsely rusty-pubescent when young; margins recurved; 2 to 3.5 in. long, 1.25 to 2 in. broad; midrib prominent, impressed above, raised beneath; main nerves distant, 4 to 8 pairs, starting at an angle of 60° with the midrib and arched upwards to join in an intramarginal looped nerve as prominent as themselves and like them raised beneath; secondary nerves few, obscure; reticulations irregular; petiole .2 to .5 in. long, slender, twisted. *Cymes* axillary, tawny-pubescent, sessile or on very short peduncles; branches 2 to 3, subracemose; the flowers in bracteate clusters; bracts small, lanceolate; pedicels short; buds conical, acuminate. *Calyx* thickly rusty-pubescent without; lobes ovate-acuminate, .05 in. long; scales alternate with the lobes, very minute or 0. *Corolla* glabrous on both surfaces; tube short; lobes linear-ligulate, twisted, much spreading, .2 in. long. *Corona*-processes acute, longer than the staminal-column, each with a short ascending tooth on the back. *Style-apex* lanceolate-conical, acuminate, with a flattened ring at its base. *Follicles* linear-acuminate, recurved at tip, 4 in. long, .3 in. broad, recurved to nearly 3 right angles apart; pericarp smooth, thin. *Seeds* oblong, flattened, .5 to .6 in. long, .15 in. broad, shortly beaked and then broadening at the base of the soft white silky coma which is 1.5 in. long; testa thin, dark brown.

KEDAH: Langkawi Island, *Curtis* 3787. PERAK: in dense jungle at 2000 to 3000 ft., *King's Collector* 8150.

3. *TOXOCARPUS SCORTECHINII*, King & Gamble, n. sp. A climbing

shrub; branchlets brown, striate, with purplish-brown rather stiff pubescence. *Leaves* coriaceous when old, almost membranous when young; ovate-oblong or ovate, acuminate at apex, acute at base; both surfaces olive-green when dry, rather dull, lower paler, glabrous except on the midrib beneath; margins recurved; 3 to 4 in. long, 1 to 1.75 in. broad; midrib prominent on the lower, impressed on the upper, surface; main nerves 7 to 8 pairs, pale, raised on the lower surface, starting at an angle of 50° with the midrib and curving upwards to meet in a looped intramarginal nerve; secondary nerves few; reticulations irregular, prominent on the lower surface; petiole .3 to .5 in. long, rusty-pubescent. *Cymes* axillary, sessile, densely clothed as in the calyx with purplish-brown pubescence, reaching .75 to 1 in. long; branches few, few-flowered; bracts minute, deciduous; pedicels about .1 in. long, thick; buds oblong; flowers rather large. *Calyx*-lobes ovate-oblong, glabrous within, .1 in. long; scales 0 or minute, alternate with the lobes within. *Corolla*-tube short, .1 to .2 in. long; lobes obovate-oblong, glabrous, .35 to .5 in. long, spreading in flower. *Corona*-processes flat, truncate, much shorter than the anthers when young, when older furnished with an erose tip as long as the anthers, minutely gland-dotted. *Style*-apex pyriform-clavate, .1 in. long; the tip conical, bifid, in acuminate lobes. *Follicles* 3 in. long, .4 to .5 in. broad, cylindric, acute; pericarp smooth, thick, brown. *Seeds* ovate, flattened, with a shining margin, .6 in. long, .25 in. broad; testa brown, thin.

PERAK: *Scortechini* 630; at Larut Hill, 3000 ft., *Derry* (Curtis 2706).

The leaves in the two specimens seem at first to differ considerably, but the flowers agree and we believe the difference is merely due to *Scortechini's* leaves coming from a much older plant.

4. *TOXOCARPUS PENANGIANUS*, King & Gamble, n. sp. A slender twining shrub; branchlets pale brown, striate, hispid with ferruginous-brown hairs. *Leaves* chartaceous; lanceolate or oblanceolate, cuspidately acuminate at apex, acuminate to cuneate at base; nearly black, shining and glabrous except on the midrib on the upper surface, pale and glabrous on the lower, except on the midrib or main nerves; margins recurved; 3.5 to 4.5 in. long, 1 to 1.25 in. broad; midrib stout, impressed above, raised beneath; main nerves 6 to 8 pairs, irregular but usually at an angle of about 50° with the midrib, slightly curved to meet an intramarginal looped nerve; secondary nerves few; reticulations irregular, prominently netted on the under surface; petiole .25 to .35 in. long, bordered by the narrow decurrent margin of the blade, densely rusty-pubescent. *Cymes* slender, rusty-pubescent, divaricate, reaching 2 in. in length and about 4 in. in breadth, sessile or very shortly

pedunculate; branches usually dichotomous, slender, bearing clusters of flowers at rather long intervals; bracts minute, subulate; pedicels 0 to .1 in. long; buds conical; flowers reddish-brown. *Calyx* hispidly rusty-pubescent; lobes ovate-acute or rounded, .05 in. long, gland-dotted. *Corolla* campanulate; tube as long as lobes; lobes ovate, margins incurved, .1 in. long, shortly villous within. *Corona*-processes very small, as long as anthers, bifid at apex. *Style-apex* columnar, clavate when young. *Fruit* not known.

PENANG: at Moniot's road, *Curtis* 2303.

5. *TOXOCARPUS LANKAWIENSIS*, King & Gamble, n. sp. A slender twining shrub; branchlets thin with brown bark. *Leaves* chartaceous; elliptic, shortly cuspidate-acuminate at apex, rounded at base; both surfaces greyish-green when dry, glabrous except along the midrib beneath; margins slightly recurved; 3 to 3.5 in. long, 1.75 to 2 in. broad; midrib slender, impressed above, raised beneath as are the 5 to 6 pairs of main nerves which start at an angle of 60° with the midrib and curve upwards to join in a looped intramarginal nerve; secondary nerves few; reticulations irregular; petiole slender, .25 to .3 in. long, hispid. *Cymes* axillary, sessile, pubescent, .5 to 1 in. long, corymbose; the flowers racemously clustered on the branches; bracts persistent, minute, ovate-acute; bracteoles similar, in sheathing pairs to each very short pedicel; buds conical, about .15 in. long; flowers yellowish with purple glandular dots. *Calyx*-tube short, .05 in. long; lobes ovate-oblong, acute, ciliate, .1 in. long; scales 0. *Corolla* campanulate; tube .1 to .15 in. long; lobes triangular-acuminate, blunt, irregular, .05 to .1 in. long, pubescent within, both with glandular purple dots. *Corona*-processes adherent to the anthers and longer than them, each incurved over the style-apex and with an upturned lobe on the back. *Style-apex* columnar, on a broad annulate base. *Fruit* not known.

KEDAH: Langkawi Island, *Curtis* 2616.

## 11. GONIOSTEMMA, Wight.

Slender climbing shrubs with warted bark. *Leaves* opposite. *Flowers* in interpetiolar, lax, many-flowered, paniculate cymes. *Calyx* 5-partite; lobes rounded, with 5 glandular scales at the base within. *Corolla* campanulate-rotate; tube lined by a toothed membrane; lobes overlapping to the left. *Corona* short, thick; the 5 processes combined in a 5-lobed tube adherent to the base of the staminal-column; the lobes triangular, shorter than the column. *Staminal-column* attached to the base of the corolla-tube, fleshy, much shorter than the style; anthers slender; appendages erect around the style-apex; pollen-masses

single or in pairs in each cell attached to minute pollen-carriers without caudicles. *Ovary* of 2 carpels; style-apex 5-angled below, produced above in a long fusiform tip. *Fruit* of 2 follicular mericarps; follicles nearly parallel, thick, lanceolate. *Seeds* large, flattened, broadly winged; cotyledons elliptic, nerved; radicle cylindric.—**DISTRIB.** One species.

**GONIOSTEMMA ACUMINATUM**, Wight Contrib. 62 (1834). A slender climbing shrub; stem glabrous, pustular; branchlets with smooth brown bark. *Leaves* somewhat fleshy when green, chartaceous and wrinkled when dry; ovate-oblong, acuminate at apex, cuneate to almost rounded at base; dark green, when dry dark olive-green on the upper and pale brown on the lower surface; margins recurved; 3 to 5 in. long, 1 to 1·75 in. broad; midrib broad, conspicuous and usually pale on the upper, obscure on the lower surface; main nerves very obscure, about 10 to 14 pairs, at about 70° with the midrib, straight to join an obscure intramarginal nerve; secondary nerves many, irregular; reticulations indistinct; petiole slender, ·75 to 1·25 in. long, channelled above. *Cymes* axillary or terminal, paniculately corymbose, reaching 6 to 7 in. in length and 5 to 6 in. in breadth, 2- to 3-chotomous; main peduncles slender, 1·5 to 3 in. long or sometimes 0; primary branches 1 to 2 in. long, remainder smaller by degrees; pedicels slender, ·2 in. long; bracts minute, acute; flower-buds oblong, ·2 to ·3 in. long; flowers cream-coloured. *Calyx*-lobes orbicular, ·05 in. long, ciliate on the margins, gland-dotted near the base, usually with 5 minute scales within, alternate with them. *Corolla*-lobes oblong-acute, glabrous, ·15 in. long; tube ·1 in. long, lined within by a membrane which ends in 5 triangular acute ciliate teeth. *Style-apex* fusiform, ·1 in. long. *Follicles* thick, recurved so as to lie nearly parallel and nearly meet at the tips, which are slightly hooked; 4 to 6 in. long, ·75 in. broad; pericarp smooth. *Seeds* many, flat, ovate, ·75 in. long, ·25 in. broad, ending in a broad flat beak, surmounted by a 2 in. long white silky coma; margins winged; testa thin, brown; albumen scanty; cotyledons oblong, 3-nerved, ·2 in. long, ·1 in. broad; radicle cylindric, ·15 in. long. Wall. Cat. 8242; Dene. in DC. Prodr. VIII. 504. *Toxocarpus acuminatus*, Benth. in Gen. Pl. II. 747; Hook. f. Fl. Br. Ind. IV. 15.

**PENANG:** on Government Hill, 1000 to 1200 ft., *Curtis* 244; *Hullett* 182. **PERAK:** at Thaipeng and Sungie Larút, *Wray* 2369, 2868, 3046; clinging to trees in dense forest near Larút, *King's Collector (Kunstler)* 2520, 6546, 6686, 10490.—**DISTRIB.** India (Sylhet, *Wallich* 8242).



12. GENIANTHUS, Hook. f.

Twining shrubs. *Leaves* opposite. *Flowers* small, in clusters in axillary, subsimple or dichotomously branched, often racemose or spicate cymes. *Calyx* very small, 5-fid; scales 5, between the bases of the lobes within. *Corolla* rotate; tube short; lobes narrow, spreading or recurved, villous on the inner face, valvate. *Corona* of 5 often lobed processes adnate to the back of the staminal-column and often longer than it. *Staminal-column* short; anthers erect; appendages short, around the style-apex and shorter than it; pollen-masses 2 in each cell, rounded, granular, on a small curved pollen-carrier without caudicles. *Ovary* of 2 carpels; style thick; style-apex 5-angled below, tip capitate or long and slender. *Fruit* of 2 divaricate, thickened, usually obtuse, follicular mericarps; testa thickened, often tomentose. *Seeds* large, flattened, winged, with a long silky coma; cotyledons small; radicle cylindric.—DISTRIB. About 6 species, of India and Malaya.

Leaves more or less lanceolate, glabrous or nearly so beneath :—

Leaves usually under 3 in. long, shortly acuminate; cymes rarely up to 4 in. long, with close flower-clusters. . . . . 1. *G. Maingayi*.

Leaves usually over 3 in. long, long-acuminate; cymes reaching 6 in. in length, with distant flower-clusters . . . . . 2. *G. Ridleyi*.

Leaves elliptic-ovate or -obovate, ferruginous-tomentose beneath :—

Main nerves of leaves at about 50° with the midrib; follicles densely rufous-velvety . . . . . 3. *G. rufo-velutinus*.

Main nerves of leaves nearly at right angles with the midrib; follicles glabrous . . . . . 4. *G. Blumei*.

1. GENIANTHUS MAINGAYI, Hook. f. in Fl. Br. Ind. IV. 16 (1883).

A slender climbing shrub; branchlets brown, terete, the uppermost purplish-pubescent; nodes swollen. *Leaves* coriaceous; obovate or oblanceolate, shortly acuminate at apex, cuneate at base, greyish-green when dry, the lower surface somewhat paler than the upper, both slightly pubescent when young; margins strongly recurved; 2·5 to 3·5 in. long, 1·25 to 1·5 in. broad; midrib prominent, with a gland at the base, raised on the lower, impressed on the upper surface, as are the 6 to 7 pairs of main nerves which curve upwards to join a looped intra-marginal nerve; secondary nerves few; reticulations few, irregular, rather broad; petiole ·25 to ·5 in. long, twisted. *Cymes* in pairs from the leaf-axils, up to 4 in. long, bearing clusters of sessile flowers racemously arranged; rachis angular, purplish-pubescent; bracts minute, ovate-acute; buds clavate; flowers white with a reddish tinge. *Calyx* purplish-pubescent without; lobes oblong, obtuse, ·05 in. long, with minute scales alternate with them at the base within. *Corolla*—

tube short, .025 in. long; lobes linear-oblong, obtuse, recurved in flower, covered within with yellowish villous hairs. *Corona*-processes 2-lobed, dark, longer than the staminal-column. *Style-apex* clavate, acute, .05 in. long. *Fruit* not known.

PERAK: on trees in dense jungle near Larút, *King's Collector* 5119. SINGAPORE: *Maingay* (K.D.) 1106.

2. *GENIANTHUS RIDLEYI*, King & Gamble, n. sp. A slender twining shrub; branchlets striate, with scattered round tubercles and covered with thick ferruginous pubescence. *Leaves* fleshy when fresh, chartaceous when dry; ovate-oblong or -lanceolate, acuminate at apex, rounded at base; dark olive-brown, dull and glabrous on the upper surface, pale and mottled and glabrous on the lower except along the midrib; margins recurved; 3 to 5 in. long, 1 to 2 in. broad; midrib slender, pale, raised on the lower surface, a cluster of small glands at the base; main nerves 6 to 8 pairs, pale, starting at an angle of about 70° with the midrib and curved upwards to meet in loops near the margin; secondary nerves irregular; reticulations obscure, chiefly transverse; petiole rusty-pubescent, twisted, .5 to .75 in. long. *Cymes* slender, divaricate, rusty-pubescent, racemosely paniculate, reaching 6 in. in length and 8 in. in breadth; peduncles none or short (up to .5 in. long); branches slender, the flowers in distinct clusters of about 3 to 5; bracts very small, ovate, deciduous; pedicels slender, up to about .15 in. long; buds ovoid. *Calyx*-tube short; lobes ovate-oblong, rounded, .05 in. long, glabrous within, densely ferruginous-villous without. *Corolla*-lobes free almost to the base, oblong, bluntly apiculate, recurved in flower, .15 in. long, covered in the upper half within with a dense white beard. *Corona*-processes acuminate, longer than the anthers. *Pollen*-carrier gland rounded, bifid; pollen-masses obscurely in fours. *Style-apex* columnar, .075 in. long. *Fruit* not known.

PERAK: on Maxwell's Hill, *Ridley* 2988; *Scortechini* 1172; at Larút, 3000 to 3500 ft., *King's Collector* 2612.

3. *GENIANTHUS RUFO-VELUTINUS*, King & Gamble, n. sp. A climbing shrub; branches and branchlets stout, densely clothed with soft chocolate-brown tomentum; nodes somewhat swollen. *Leaves* coriaceous; elliptic-ovate or -obovate, acuminate at apex, cuneate or attenuate or rounded at base; upper surface shining, glabrous or slightly villous, pubescent on the midrib and main nerves; lower surface ferruginous-villous, especially on the nerves, dull; margins strongly recurved; 4 to 6 in. long, 2 to 3 in. broad; midrib stout, impressed above, as are the 7 to 9 pairs of main nerves which, leaving the midrib at an angle of about 50°, are at first straight and then curve upwards to join a rather obscure intramarginal looped nerve, also impressed; secondary nerves

few; reticulations transverse, irregular; petiole stout, .75 to 1 in. long, densely ferruginous-tomentose. *Cymes* densely ferruginous-tomentose, few-branched, on .25 to .5 in. long peduncles, reaching 4 in. long and broad; branches spicate-paniculate; the flowers in small clusters, sessile or very shortly peduncled; bracts minute, ovate-acute, deciduous; buds oblong-conical; flowers cream-coloured. *Calyx* campanulate; tube short, .025 in. long; lobes ovate, glabrous within, as long as tube; scales between them within 0 or very minute. *Corolla*-tube short, .05 in. long; lobes linear-oblong, 1 in. long, densely white-villous within. *Corona* adherent to the staminal-column below, free above and longer, each process furnished with an upturned tooth on the back. *Stamens* slender, appendages acute; pollen-carriers semicircular; pollen-masses 2 to each cell, rounded. *Style-apex* columnar, ringed at the base. *Follicles* divaricate in one straight line, cylindric, very obtuse, 4 in. long, about 1 in. broad; pericarp densely covered with chocolate-brown soft wool. *Seeds* oblong, slightly winged, .75 in. long, .25 in. broad, produced above in a short beak broad at the tip which bears a copious whitish silky coma 2 in. long; testa thin; albumen scanty; cotyledons (immature) oblong; radicle stout.

PERAK: on large trees in dense forest, *King's Collector* 5611, 6865, 6882.

4. *GENIANTHUS BLUMEI*, King & Gamble. A climbing shrub; branches stout, the size of a swan's quill, brown, rugose, lenticellate; branchlets ferruginous-tomentose. *Leaves* elliptic-ovate or -obovate, shortly acuminate at apex, attenuate when young, rounded when old at base; upper surface glabrous except on the midrib, punctulate, lower surface densely ferruginous-tomentose when young, less so when old; margins recurved; 3 to 6 in. long, 2 to 4 in. broad; midrib stout, impressed above, much raised beneath, sometimes with small glands at the base; main nerves 7 to 10 pairs, strong, lower ones nearly at right angles to the midrib, upper at about 60°, at first straight, then curved to and along the margin, impressed above; secondary nerves none; reticulations netted, obscure; petiole .5 to .75 in. long, twisted at base, tomentose. *Cymes* subsessile, lateral, up to 3 in. long; branches divaricate, bearing sessile clusters of densely tomentose small flowers; buds ovoid. *Calyx*-lobes ovate, acute, densely ferruginous-pubescent without. *Corolla*-lobes very short, white-villous within. *Corona*-processes ending in a linear-truncate ligule. *Style-apex* elongate-apiculate. *Follicles* 2, divaricate in a straight line, cylindric, obtuse; tip slightly recurved; 3 to 4 in. long, .75 in. broad; pericarp very thick, smooth, glabrous. *Seeds* ovate, .6 in. long, .3 in. broad; margin winged; tip truncate, bearing a 2 in. long pale brown silky coma; cotyledons cordate, .25 in. long; radicle cylindric, .15 in. long. *Toxocarpus Blumei*, Dene. in DC. Prodr. VIII.

506; Miq. Fl. Ind. Bat. II. 475. *Secamone macrophylla*  $\beta$ . *fulva*, Bl. Bijdr. 1050; Hassk. Cat. Bog. 125.

PERAK: at Sungie Larút, Wray 2287; *Scortechini*.—DISTRIB. Java.

There is some doubt about this species, due to the only specimen of the Java plant available being very imperfect, while both Wray's and Scortechini's specimens are in fruit only.

### Tribe III. CYNANCHEÆ.

Filaments of the stamens connate in a column if present; anthers adnate to the upper part of the style, with membranous appendages. Pollen-contents of each anther-cell united in a waxy mass; the pollen-masses opaque, attached in pairs to the pollen-carriers by short or long caudicles from which they are pendulous in the anther-cells. Pollen-carriers turgid, rarely flattened, with a dorsal suture, hard and horny, reddish-brown to black, attached at the angles of the style-apex.

Corona of 5 processes adnate to the anther-column:—

Stem erect:—

- |   |                 |
|---|-----------------|
| Corona-processes laterally compressed, circinately curved |                 |
| at base .. .. .   | 13. CALOTROPIS. |
| Corona-processes cucullate with an interior horn          | 14. ASCLEPIAS.  |

Stem twining:—

- |  |                   |
|--|-------------------|
| Flowers large, fleshy; corona-processes .5 in. long, adnate to the column .. .. .                  | 15. RHAPHISTEMMA. |
| Flowers small, thin; corona-processes about .1 in. long, attached to the base of the column.. .. . | 16. ISCHNOSTEMMA. |
| Corona annular, adnate to the base of the column and surrounding it .. .. .                        | 17. CYNANCHUM.    |

### 13. CALOTROPIS, Br.

Erect large shrubs or small trees. *Leaves* opposite, broad, subsessile. *Flowers* medium-sized, in umbellate or subracemose pedunculate cymes, arising laterally from the stem between the bases of the leaves. *Calyx* 5-lobed; the lobes with small glandular scales at the base within. *Corolla* broadly campanulate or subrotate, divided more than half-way down in 5 broad valvate lobes which are usually reflexed in flower. *Corona* of 5 laterally compressed fleshy processes, adnate to and standing out as buttresses from the staminal-column, furnished at the base with an upcurved and involute spur, bifid at the apex or with two obtuse auricles. *Stamens* inserted at the base of the corolla; the anthers short, broad, somewhat horny at the angled wings; appendages short, broad, slightly lobed, membranous, inflexed over the style-apex; anther-cells a shallow membranous pouch; pollen-masses solitary, pendulous, flattened, spathulate, attached by slender jointed caudicles to the oblong, somewhat quadrate, pollen-carrier. *Ovary* of 2 distinct cells,



joined in a slender style bearing a depressed pentagonal style-apex. *Fruit* of 2 large, inflated, fleshy, thick, follicular mericarps. *Seeds* ovate, plano-convex, with broad apex surmounted by a coma of long slender silky hairs.—**DISTRIB.** Species 4, of Tropical Asia: in India, China, and the Malay Archipelago, one extending into Africa.

**CALOTROPIS GIGANTEA**, Br. in Ait. Hort. Kew, ed. 2, ii. 78 (1811). A large shrub, sometimes almost a small tree; branches stout, fleshy, with ash-coloured bark; branchlets covered with soft white woolly tomentum. *Leaves* somewhat leathery when green, membranous when dry; elliptic-oblong or obovate-oblong, acute at apex, cordate at base; both surfaces when young covered with very short white cottony tomentum, when old the upper glabrous, the lower glabrescent; 4 to 8 in. long, 2 to 4 in. broad; midrib broad, with a large gland at the base on the upper surface; main nerves 6 to 8 pairs, the lowest curved downwards, the rest upwards to and along the margin; reticulations few, not prominent; petiole none or extremely short. *Cymes* densely white-tomentose, on peduncles 1·5 to 4·5 in. long; branches none or few, 1 to 1·5 in. long, bearing umbels of 6 to 12 flowers on thick pedicels reaching 1 to 1·25 in. long; bracts linear-oblong, deciduous; buds ovoid, obtuse; flowers greyish-white with rose or lilac markings, 1 to 1·5 in. in diam. *Calyx*-lobes ovate-acuminate, about ·15 in. long, cottony without; glands usually about 3. *Corolla*-lobes ovate-lanceolate, acute, reflexed in flower, ·25 to ·5 in. long. *Corona*-processes ·25 to ·35 in. long, with obtuse auricles on either side near the apex and much incurved spur at the base; the keel puberulous. *Anther*-appendages 2- to 3-lobed, short, curved over the style-apex. *Ovary* and style ·35 in. long, slender; style-apex star-shaped, flat, ·15 in. broad, the umbo depressed, the horns of the star bearing the pollen-carriers. *Follicles* 3·5 to 5 in. long, oblong, broad, thick, fleshy, ventricose, pale yellow or green when fresh, recurved. *Seeds* numerous, ·25 to ·3 in. long by ·2 in. broad, broadly ovate, flattened; testa brown, narrowly margined, minutely tomentose; coma 1 to 1·25 in. long; cotyledons ovate-cordate, ·125 in. long; radicle ·05 in. long, ovate, acute. Hamilt. in Trans. Linn. Soc. XIV. 245; Wight Contrib. 53, and Ill. t. 155, 156a; Dalz. & Gibs. Bomb. Fl. 149; Brandis For. Fl. 331; Griff. Notul. IV. 68, and Ic. Pl. Asiat. t. 397, 398; Dene. in DC. Prodr. VIII. 535; Bot. Reg. t. 58; Miq. Fl. Ind. Bat. II. 481; Hook. f. Fl. Br. Ind. IV. 17; Bot. Mag. t. 6862; Kurz For. Fl. II. 200; Trimen Fl. Ceyl. III. 148; Cooke Fl. Bomb. II. 151; Prain Beng. Plants 688; Watt in Kew Bull. 1900, p. 8. *Asclepias gigantea*, Willd. Sp. Pl. 1264; Roxb. Hort. Beng. 20, and Fl. Ind. II. 30. "*Ericu*" and "*Bel-ericu*," Rheede Hort. Mal. II. 52, 56, t. 31.

PENANG: *Haji Husain* for *Curtis*. PERAK: *Wray* 2123 (introd.);

*Scortechini*. MALACCA: *Maingay* (K.D.) 1107. SINGAPORE: *Cuming* 2408.—DISTRIB. India, Burma, Ceylon, Malay Islands, S. China.

#### 14. ASCLEPIAS, Linn.

Perennial herbs or shrubs, often with tuberous roots, juice milky, stems usually erect. *Leaves* opposite or whorled. *Flowers* in pedunculate or sessile umbels, terminal or lateral between the leaves, usually orange-yellow, red or green. *Calyx* deeply 5-partite, with 5 to 10 glandular scales within at the base. *Corolla* rotate, deeply 5-lobed; the lobes valvate or slightly overlapping in bud, lobes usually reflexed when open. *Corona* of 5 processes arising from the staminal-column and adnate to it above; lobes erect, concave-cucullate, with usually a tooth-horn protruding from within. *Stamens* affixed to the base of the corolla; the filaments connate in a tube; anthers with a membranous appendage inflexed over the style-apex; pollen-masses pendulous, flattened, solitary in each anther-cell, attached to the hard pollen-carriers by caudicles. *Styles* free below, connected above; style-apex columnar, truncate or depressed and often umbonate at tip. *Follicles* variable, smooth or softly echinate. *Seeds* comose.—DISTRIB. Species many, chiefly of Africa and America, 2 only in Arabia and the Orient, and 2 naturalized in most warm regions.

ASCLEPIAS CURASSAVICA, Linn. Sp. Pl. I. 215 (1753). A perennial erect herb; stems 2 to 3 ft. high, pale, glabrous, smooth. *Leaves* lanceolate, acuminate at apex, cuneately acuminate at base, glabrous on both surfaces; 2·5 to 5·5 in. long, .5 to 1 in. broad; midrib slender, raised beneath; main nerves 12 to 15 pairs, irregular, curving upwards at an acute angle; reticulations not very prominent; petiole .25 to .5 in. long. *Umbels* lateral and terminal, 6- to 12-flowered; peduncles 1 to 3 in. long, puberulous; pedicels .5 to .75 in. long, puberulous; buds ovoid; flowers orange-scarlet. *Calyx*-lobes lanceolate, acute, .15 in. long, puberulous; scales minute. *Corolla* reflexed when open; lobes oblong, acute, .2 to .25 in. long, glabrous, slightly overlapping to the right in bud. *Corona*-processes arising about .1 in. above the base of the staminal-column, spathulate-cucullate, .1 to .15 in. long with a protruding horn as long as themselves arising from the base within and curved inwards over the staminal-column. *Anthers* auricled at base; appendages orbicular, inflexed over the style-apex. *Style-apex* columnar, depressed, 5-angled. *Follicles* lanceolate-acuminate, 3 to 3·5 in. long; pericarp thin, smooth, glabrous. *Seeds* elliptic, plano-convex, .2 in. long, .15 in. broad, with a broad, thin margin; testa dark brown, thin, lineate; coma .75 to 1 in. long; cotyledons ovate, small; radicle cylindric,

nearly as long as cotyledons. Roxb. Hort. Beng. 20; Lodd. Bot. Cab. t. 349; Bot. Reg. I. t. 81; Dene. in DC. Prodr. VIII. 566; Dalz. and Gibs. Bomb. Fl. Suppl. 54; Miq. Fl. Ind. Bat. II. 485; Baill. Hist. des Pl. X. 221, figs. 157-165; Hook. f. Fl. Br. Ind. IV. 18; N. E. Brown in Dyer Fl. Trop. Afr. IV. i. 328; Cooke Fl. Bomb. II. 180; Prain Beng. Plants 689.

PERAK: *Scortechini*. JOHORE: *Curtis*. SINGAPORE: *Hullett* 85. An introduced plant, now naturalized in Africa, India and Malaya, chiefly in waste places near villages.—DISTRIB. Tropical America, where native.

15. RHAPHISTEMMA, Wall.

Climbing glabrous shrubs with milky juice. *Leaves* opposite, membranous. *Flowers* in axillary long-peduncled umbelliform or subracemose cymes, large, white, long-pedicelled. *Calyx* deeply 5-fid or 5-partite, 5-glandular within at base. *Corolla* campanulate, 5-lobed; lobes spreading, twisted in bud, overlapping to the right; tube broad. *Corona*-processes 5, membranous, subulate-acuminate, adnate to the staminal-column and produced above it to twice its length. *Stamens* affixed to the base of the corolla; filaments connate in a short tube; anthers with an inflexed membranous appendage; pollen-masses one in each cell, oblong, not compressed, pendulous, waxy, attached to the thick hollow furrowed hard pollen-carrier by short clavate caudicles. *Ovary* of 2 carpels; style distinct to near the top; style-apex large, fleshy, 5-lobed, convex at tip. *Fruit* of (by abortion) 1 thick, fleshy, smooth, subventricose follicle. *Seeds* plano-convex, margined, comose.—DISTRIB. Two species; one of India and Burma and the Malay Peninsula, the other of Java.

RHAPHISTEMMA PULCHELLUM, Wall. Pl. As. Rar. II. 50, t. 163 (1831) and Cat. 8221A. A glabrous climbing shrub; branches greyish-brown when dry, terete, much twisted; the nodes with a line of small glands between the leaf-petioles. *Leaves* membranous; ovate-acuminate at apex, cordate at base, with wide sinus often .75 to 1 in. deep; lower surface pale when dry; 3 to 7 in. long, 2.5 to 4.5 in. broad; midrib prominent, bearing at its base a cluster of subulate small fleshy glands; main nerves 6 to 8 pairs, the lowest 2 to 3 pairs radiating from opposite the gland-cluster, the rest curving upwards and anastomosing near the margin, raised beneath; reticulations few, conspicuous, transverse; petiole 2 to 5 in. long, sulcate above. *Cymes* 4- to 6-flowered; peduncle 1.5 to 5 in. long; branches few; pedicels slender, .5 to 2 in. long; bracts short, lanceolate, deciduous; buds oblong, .5 to 1 in. long; flowers white, thick. *Calyx*-lobes ovate-oblong, variable in size, usually .15 to .2 in. long; glands minute. *Corolla*-lobes oblong, obtuse, reflexed in

flower, .5 in. long; tube longer. *Corona*-processes subulate-acuminate, membranous, .5 in. long, .1 in. broad. *Anthers* horny, yellowish, smooth, sagittate at base; appendages rounded, membranous, incurved over the stigma. *Style-apex* 5-lobed; the lobes horned; tip umbonate, minutely pitted. *Follicles* solitary, fusiform, turgid, somewhat saccate at base, the apex obtuse with a short hook; pericarp leathery, smooth. *Seeds* plano-convex with a broad margin, ovate, .4 in. long, with a broad apex bearing a silky coma 1 to 2 in. long; testa brown, thin; cotyledons ovate, cordate, .125 in. long; radicle cylindric, .75 in. long. Wight Contrib. 55; Dene. in DC. Prodr. VIII. 516; Paxt. Fl. Gard. III. t. 101; Paxt. Mag. XIV. 27, with fig.; Fl. des Serres t. 223; Miq. Fl. Ind. Bat. II. 477; Hook. f. Fl. Br. Ind. IV. 19; Prain Beng. Plants 691. *Asclepias pulchella*, Roxb. Hort. Beng. 21, Fl. Ind. II. 54.

KEDAH: Coah, Lankawi Island, *Curtis* 2118. PENANG: *Curtis* (cult.). PERAK: in bamboo jungle at about 400 to 600 ft. Ulu Bubong, *King's Collector* 10483. SINGAPORE: *Deschamps* (cult.); *G. King* (cult.).—DISTRIB. India (Sikkim, Chota Nagpur, Sylhet, Assam and Cachet), Burma.

#### 16. ISCHNOSTEMMA, King & Gamble, nov. gen.

Twining slender undershrubs. *Leaves* opposite. *Flowers* in slender few-flowered, lateral, pedunculate umbels; pedicels filiform. *Calyx* 5-fid; lobes acuminate. *Corolla* rotate; tube short; lobes long, slender, overlapping to the right, twisted to the left in bud. *Corona* of 5 membranous lanceolate flattened processes attached to the base of the staminal-column. *Staminal-column* attached to the base of the corolla-tube; anthers slender; appendages short, membranous, obtuse, connivent over the style-apex; pollen-masses 1 in each cell, pendulous, ellipsoid, attached by slender clavate descending caudicles to the crustaceous pollen-carriers. *Ovary* of 2 carpels; style connate above; style-apex 5-angled; tip rounded. *Fruit* of 1 (or 2 ?) long-acuminate slender, follicular mericarps; testa thin, smooth. *Seeds* small, flat, winged, nearly orbicular, comose; albumen scanty; cotyledons small, ovate; radicle cylindric.—DISTRIB. One species; Malay Peninsula and Philippine Islands.

ISCHNOSTEMMA SELANGORICA, King & Gamble, n. sp. A slender twining greyish undershrub; branchlets slender, terete. *Leaves* membranous, variable; ovate-lanceolate obovate or oblanceolate, mucronate at apex, attenuate at base; glabrous and pale green on both surfaces; 1 to 1.75 in. long, .5 to .75 in. broad; midrib broad, flattened; main nerves 4 to 6 pairs, very faint, curving upwards to meet in a faint intra-marginal nerve; reticulations obscure; petiole slender, .25 to .5 in. long.



*Umbels* usually 3- to 5-flowered; peduncles .75 in. long; bracts minute, subulate; pedicels filiform, .5 to .75 in. long; buds conical; flower yellow. *Calyx* cleft to the base; lobes lanceolate, acuminate, .1 in. long. *Corolla*-tube very short; lobes lanceolate, acuminate, .2 in. long. *Corona*-processes acuminate, erect, longer than the column. *Style-apex* hemispheric at tip. *Follicles* lanceolate, long-acuminate, 2.5 in. long, .25 in. broad; testa thin, smooth. *Seeds* flattened, nearly orbicular, .175 in. long, .1 in. broad, broadly winged; testa brown, thin, slightly granular; embryo very small, .03 in. long in all.

SELANGOR: at Kwala Selangor, in mangrove swamps, *Ridley* 7564.—  
DISTRIB. Philippine Islands, in Central Luzon (*Loher* 4039, 4040).

# 17. CYNANCHUM, Linn.

Herbs or shrubs, erect or twining. *Leaves* opposite. *Flowers* small, in sessile or pedunculate corymbose or umbellate cymes or racemes, subaxillary or lateral between the bases of the petioles. *Calyx* 5-partite, with 5 to 10 glandular scales within or eglandular. *Corolla* deeply 5-fid, rotate or campanulate; lobes slightly overlapping to the right in bud, more or less twisted. *Corona* arising from the staminal-column at or near the base, often membranous, annular, cupular or tubular, toothed or lobed at the top or divided more or less deeply into 5 entire or toothed processes. *Staminal-column* arising at or near the base of the corolla; filament part varying from none to rather long and slender; anthers hardened; appendages membranous, erect or inflexed over the style-apex; pollen-masses 1 in each cell, oblong, not compressed, pendulous, attached by a caudicle to the rather large horny pollen-carriers. *Ovary* of 2 carpels; styles free below; style-apex 5-lobed, truncate, conical or rostrate. *Fruit* of 2 smooth follicular mericarps, winged or entire, sometimes with tubercular processes. *Seeds* plano-convex, tipped with a silky coma.—DISTRIB. Cosmopolitan, species about 100.

Leaves ovate or oblong, not cordate at base; peduncles short;

follicles smooth . . . . . 1. *C. ovalifolium*.

Leaves ovate, deeply cordate at base; peduncles long; follicles

with soft hooked spines . . . . . 2. *C. corymbosum*.

1. CYNANCHUM OVALIFOLIUM, Wight Contrib. 57 (1834). A nearly glabrous, small twining shrub; branchlets very slender, terete, pale brown. *Leaves* membranous; ovate or oblong, acuminate at apex, rounded or subacute at base, often furnished with one or two small axillary, unequal-sided leaflets at the base of the petiole; both surfaces glabrous, lower pale; margins slightly recurved; 3 to 4.5 in. long, 1.25

to 2 in. broad; the axillary leaflets about .5 in. long; midrib rather broad, channelled above; main nerves 7 to 8 pairs, at first straight, then curved upwards to form a looped intramarginal nerve near the edge; secondary nerves few; reticulations few, obscure; petiole .5 to .75 in. long, articulate near the base, the upper side channelled and with a line of hairs, the base enlarged, those of each pair forming a cup round the branchlet. *Cymes* lateral, between the leaves, about 4-to, 8-flowered, racemose; peduncle .5 to .75 in. long; pedicels .1 to .15 in. long, puberulous; bracts small, obtuse; flower-buds spherical. *Calyx*-lobes ovate, .05 in. long; glandular scales 5, minute, alternate with the lobes. *Corolla* cleft nearly to the base; lobes concave, obtuse, .15 in. long. *Corona* membranous, .1 to .15 in. deep, cylindric, divided above into 10 or more irregular teeth. *Staminal-column* rather long; wings horny, sagittate at base; appendages membranous rounded, crenate, erect or slightly curved over the style-apex; pollen-masses ellipsoid, waxy, attached by clavate caudicles to the rather large black pollen-carriers. *Style-apex* 5-angled, depressed, with a small rounded tip. *Follicles* usually 1 only, thickly coriaceous, nearly straight on the dorsal, curved on the ventral edge, 3 to 5 in. long by .75 to 1 in. broad, tip recurved-hooked, base slightly gibbous; pericarp smooth. *Seeds* nearly orbicular, plano-convex, broadly winged, .3 to .35 in. long, .25 in. broad, ending in a broad tip which bears a white silky coma 1.5 in. long; testa thin, granular and wrinkled, dark brown; cotyledons ovate, obtuse, .1 in. by .075 in.; radicle cylindric, .05 in. long. Wall. Cat. 8226; Hook. f. Fl. Br. Ind. IV. 23. *Cynoctonum ovalifolium*, Dcne. in DC. Prodr. VIII. 529; Miq. Fl. Ind. Bat. II. 479.

PENANG: Wallich 8226; Curtis 871, 1270. PROVINCE WELLESLEY: on the road to Arakuda, Ridley 7029. PERAK: Wray 1763, 2061, 2939; King's Collector, 2575, 8385, 8450; Scortechini 789. MALACCA: Maingay (K.D.) 1140. SINGAPORE: Ridley 10160.—DISTRIB. Java.

2. *CYNANCHUM CORYMBOSUM*, Wight Contrib. 56 (1834). A slender climbing shrub; stem rather stout; branchlets terete, glabrous, with rather long internodes. *Leaves* membranous when dry, dull green when fresh; ovate or orbicular, cuspidately acuminate at apex, cordate at base with a sinus .4 in. deep, .5 in. broad; under surface pale, glaucous, upper surface glabrous except the midrib and main nerves; margins slightly recurved, 2 to 6 in. long, 1 to 3 in. broad; midrib slender, raised beneath, furnished at the base with a tuft of minute glands; main nerves 5 to 6 pairs, the lowest 3 pairs spreading from opposite the gland-tuft, the rest curved upwards to near the margin; reticulations rather scanty, chiefly transverse; petiole 1.5 to 3 in. long, slender. *Cymes* corymbiform, many-flowered, 2 to 3 in. long, glabrous;

peduncle slender, about 1·5 in. long; bracts minute, subulate; pedicels slender, ·5 in. long; buds ovoid. *Calyx* deeply cleft; lobes ovate, acute, hyaline on the margins, ·05 in. long; scales obscure. *Corolla* campanulate; tube very short; lobes erect, oblong, obtuse, ·15 in. long; margins usually somewhat reflexed. *Corona* as long as corolla-lobes, campanulate, irregularly crenately 10- or more lobed with 10 internal longitudinal folds. *Staminal-column* inserted at the base of the corolla-tube; anther-wings broad, horny; cells pocket-like; appendages ovate-acute; pollen-masses ellipsoid, attached by short clavate caudicles to the small oblong pollen-carriers. *Style-apex* 5-angled; tip acuminate, bifid. *Follicles* 1 or 2, reddish, lanceolate, long-acuminate, 3 to 5 in. long, 1 to 1·5 in. broad; pericarp thick, densely clothed with soft reversed-hooked spines ·25 to ·5 in. long. *Seeds* orbicular-ovoid, ·5 in. long and nearly as broad, wrinkled, broadly winged, deeply dentate-crenate at the lower end; tip truncate, crowned with a 1 to 1·5 in. long white silky coma; testa dark brown, shining, rugose on the dorsal face; cotyledons elliptic, ·15 in. long; radicle cylindric, acute, ·075 in. long. Wall. Cat. 8222, 8231; Hook. f. Fl. Br. Ind. IV. 24. *Cynoctonum corymbosum*, Dene. in DC. Prodr. VIII. 528.

PENANG: *Wallich*. PERAK: on shrubs at 300 to 500 ft., *King's Collector* 5301; *Scortechini*.—DISTRIB. India (Sikkim, Assam, Sylhet, Cachar, Nicobar Islands).

#### Tribe IV. MARSDENIÆ.

Stamens with filaments connate into a tube; anthers erect or incumbent on the style-apex and adnate to it at their base, with flat or inflated membranous appendages. Pollen-contents of each anther-cell united into a waxy mass; pollen-masses opaque, without a pellucid margin, attached in pairs to the pollen-carriers by long or short caudicles, erect or ascending or horizontal, never entirely pendulous, sometimes very minute and the caudicles very slender; pollen-carriers hard and horny, with a dorsal suture, usually dark-coloured.

Corolla-lobes overlapping (sometimes valvate or nearly so in

*Gongronema*):—

Corona none .. .. . 18. SARCOLOBUS.

Corona corolline:—

Corolla-lobes long; style-apex included; herbs .. 19. PENTASACME.

Corolla-lobes short; style-apex exserted; twining shrubs .. 20. GYMNEMA.

Corona staminal, rarely none:—

Corolla urceolate or campanulate, sometimes rotate:—

Corona-processes fleshy, rounded .. .. 21. GONGRONEMA.

- Corona-processes fleshy or membranous, with one or sometimes two apical teeth, sometimes none .. 22. *MARSDENIA*.
- Corolla hypocrateriform :—
- Corolla small or moderate-sized; corona-processes compressed, beaked .. .. 23. *PERGULARIA*.
- Corolla large; corona-processes none or flattened .. 24. *STEPHANOTIS*.
- Corolla rotate or rotate-campanulate; corona-processes small, on the filament part of the column .. 25. *TYLOPHORA*.
- Corolla-lobes valvate :—
- Corolla rotate or subcampanulate :—
- Corona-processes spreading, lower lobes usually dentate or laciniate, upper lobes tubercular or absent; leaves not fleshy; climbing shrubs .. .. 26. *HETEROSTEMMA*.
- Corona stellate, lower lobes erect or spreading, upper beaked; leaves usually fleshy; epiphytes or epiphytic climbers .. .. 27. *HOYA*.
- Corolla urceolate or cylindric or campanulate; corona-processes very membranous; epiphytes .. 28. *DISCHIDIA*.
- Corolla-tube short, lobes long subulate; twining under-shrub .. .. 29. *PYCNORHACHIS*.

18. *SARCOLOBUS*, Br.

Twining glabrous shrubs. *Leaves* opposite. *Flowers* small, in crowded, pedunculate, axillary or interpetiolar corymbiform cymes. *Calyx* 5-partite, with 5 minute glandular scales at the base within. *Corolla* campanulate or subrotate, 5-fid; the lobes overlapping to the right. *Corona* none. *Stamens* affixed to the base of the corolla; filaments connate in a short tube; anthers broad, ending in a spatulate inflexed appendage; pollen-masses solitary in each cell, erect, compressed, obovate, attached by long filiform twisted caudicles to the narrow, long, channelled pollen-carriers. *Ovary* of 2 distinct carpels; styles distinct below, ending above in a 5-angled style-apex with flat or slightly rounded tip. *Fruit* of usually 1 thick globose and smooth or ovate and 2-keeled follicular mericarp; pericarp fleshy, chartaceous when dry. *Seeds* large, marginate, without coma.—*DISTRIB.* Species 3: two of India, the Malay Peninsula, and the Andaman and Nicobar Islands; the third of Java.

*SARCOLOBUS GLOBOSUS*, Wall. in *Asiat. Research.* XII. 577, t. 4 (1818), and Cat. 4468. A twining shrub; branchlets slender, smooth, shining, callose-punctate, pale brown. *Leaves* thinly coriaceous; oblong or ovate-oblong, acute or shortly acuminate at apex, rounded at base and usually somewhat unequal-sided; both surfaces brown when dry, lower glaucous, young leaves slightly puberulous; margins slightly recurved; 3 to 4.5 in. long, 1 to 1.75 in. broad; midrib slender, channelled above and furnished with a small cluster of glands at the base,



raised on the lower surface; main nerves 5 to 7 pairs, broadly arched to meet in a looped intramarginal nerve rather far from the edge; reticulations irregular, chiefly transverse; petiole slender, .5 to 1 in. long, channelled and puberulous on the upper surface. *Cymes* many-flowered, slightly puberulous; peduncles .5 to .75 in. long, thickened at top below the corymbs; pedicels .25 in. long, slender; bracts small, triangular; buds broadly ovoid. *Calyx*-lobes scarious, ovate, obtuse, .05 to .1 in. long; scales minute, 5 to 10. *Corolla*-lobes nearly orbicular, pubescent within, .2 in. long, pale purple. *Anthers* slightly auricled; appendages much incurved. *Style*-apex 5-lobed with a rounded tip. *Follicle* globose, retuse at apex and base, 4 in. in diam.; pericarp very thick, with many raised dots. *Seeds* broadly obovate, flat with a raised border, apiculate, .7 to 1 in. long; coma none; testa dark brown; cotyledons obovate, retuse at apex; radicle small. Wight Contrib. 47, and Ic. t. 1273; Dene. in DC. Prodr. VIII. 625; Hook. f. Fl. Br. Ind. IV. 27; Prain Beng. Plants 693. *S. carinatus*, Griff. Notul. IV. 53, and in Ic. Pl. Asiat. t. 410 (*not of Wall.*).

PERAK: *Scortechini* 127, 1393; *King's Collector* 1028, 1162. MALACCA: *Griffith* 3773. SINGAPORE: *Hullett* 32, 648; *Ridley* 5745.—DISTRIB. India (Salt Lakes, Calcutta, *C. B. Clarke*), Burma (Mergui, *Griffith*), Borneo (*Haviland*). A plant of the banks of salt river-creeks.

#### 19. PENTASACME, Wall.

Tufted erect glabrous herbs, with slender simple stems and many wiry roots, rooting on rocks. *Leaves* opposite, membranous, narrow. *Flowers* yellowish or white, small, in short axillary umbelliform or racemose cymes; pedicels capillary. *Calyx* 5-partite, with 5 glandular scales within. *Corolla*-tube short, campanulate; lobes narrow, caudate, twisted, overlapping to the right in bud. *Corona*-processes 5, on the corolla-tube, entire or toothed. *Staminal-column* very short; anther-appendages membranous; pollen-masses 1 in each cell, erect, ovoid, waxy, attached near the middle by a slender caudicle to an oblong pollen-carrier. *Ovary* of 2 carpels; style short; style-apex 5-angled, conical or beaked at apex. *Fruit* of 1 slender terete follicle, straight; pericarp thin, smooth. *Seeds* oblong-spathulate, not or very slightly winged, convex on both surfaces; cotyledons ovate; radicle cylindric.—DISTRIB. Species 3 or 4: two of India and Malaya, the other Chinese.

PENTASACME CAUDATUM, Wall. Cat. 8234 (1829). A tufted erect glabrous herb; stems simple, many, slender, 12 to 18 in. long, pale brown, terete, .1 in. in diam.; roots many, slender, twisted, spreading. *Leaves* membranous; linear-lanceolate, long caudate-acuminate at apex, narrowed at base; pale on both surfaces when dry, under surface

glaucous; 2 to 4 in. long, .2 to .4 in. broad; midrib slender, prominent; main nerves about 12 pairs, obscure, acutely curving upwards to meet an intramarginal slightly-looped nerve; reticulations hardly visible; petiole none or up to .1 in. long; stem clasping at base. *Cymes* racemose, 1- to 6-flowered, very short; peduncles very short; pedicels capillary, .2 to .25 in. long; bracts minute; flowers white; buds conical. *Calyx*-lobes ovate-lanceolate, acuminate, .06 in. long; glands dark. *Corolla*-lobes caudate-acuminate from a broad base, .25 in. long; tip obtuse. *Corona*-processes short, obscurely 4-lobed behind; lobes with several short obtuse teeth in front. *Follicles* 1.75 to 3 in. long, very slender, straight; pericarp thin. *Seeds* ovate-spathulate, with a minute wing near the base, concave, .15 in. long; tip obliquely truncate with a white silky coma .5 to .75 in. long; testa thin, brown, papillose; cotyledons ovate, .05 in. long; radicle cylindric, .025 in. long. Wight Contrib. 60; Dene. in DC. Prodr. VIII. 627; Miq. Fl. Ind. Bat. II. 501; Hook. f. Fl. Br. Ind. IV. 28. *Spiladocorys angustifolia*, Ridley in Trans. Linn. Soc. Ser. 2, III. 322, t. 63.

PERAK: growing on rocks in the beds of streams; *Curtis*; *Ridley* 2885; *Scortechini* 1310; *Wray* 1980; *King's Collector* 10685. PAHANG: on Tahan river, *Ridley* 2589.—DISTRIB. India (Khasia Hills, Patkoi Hills, and Sylhet), Burma.

## 20. GYMNEMA, Br.

Twining shrubs or undershrubs. *Leaves* opposite. *Flowers* small, in crowded sublateral or opposite umbelliform cymes. *Calyx* 5-partite, eglandular or with 5 to 10 glandular scales at the base within. *Corolla* subrotate, campanulate or urceolate, 5-fid; lobes thick, narrowly overlapping to the right in bud or subvalvate. *Corona*-processes 5, arising from and adnate to the corolla-tube, either of 5 fleshy lobes adnate up to the mouth of the corolla-tube with more or less free incurved points, or of 5 pairs of fleshy ridges on the lower part of the tube, alternating with the corolla-lobes. *Staminal-column* arising from the base of the corolla; anthers short, erect, with short membranous appendages; pollen-masses erect, attached to the pollen-carriers by very short caudicles. *Ovary* of 2 carpels; styles free to near the top; style-apex large, conical, clavate or capitate, exerted beyond the anthers. *Fruit* of 2 (or 1) smooth follicular mericarps. *Seeds* comose.—DISTRIB. About 20 species, chiefly Asiatic, two extending to Central Africa, others to Australia.

Corolla-tube short, with corona-processes of 5 fleshy villous lobes on the throat, the free points exerted in the sinuses :—

Leaves 3 to 6 in. long, tawny-pubescent beneath; cymes subcapitate, shortly peduncled .. ..

1. *G. acuminatum*.

- Leaves 2 to 4 in. long, nearly glabrous; cymes umbellate,  
 peduncled .. .. . 2. *G. lactiferum* var.  
*nitens*.  
 Leaves 1 to 2 in. long, tawny-pubescent; cymes subsessile .. 3. *G. Maingayi*.  
 Corolla-tube elongate, with corona-processes consisting of villous  
 ridges in the lower part of the tube, but no free points in the  
 sinuses; leaves 2·5 to 6 in. long .. .. . 4. *G. tingens*.

1. GYMNEMA ACUMINATUM, Wall. Tent. Fl. Nap. 50 (1826); Cat. 8187. A large twining shrub with corky bark; branchlets softly tawny-pubescent. *Leaves* coriaceous; ovate or ovate-elliptic, acuminate at apex, rounded at base; upper surface glabrous, lower tawny-pubescent; margin slightly recurved; 3 to 6 in. long, 1·75 to 2·25 in. broad; midrib stout; main nerves 4 to 6 pairs, curved upwards to anastomose near the margin; reticulations in a prominent network; petiole ·5 in. long. *Cymes* in pairs, many-flowered, subcapitate, tawny-pubescent; peduncle as long as or shorter than the petiole, pedicels very short. *Calyx*-lobes ovate-acute, ·05 in. long, pubescent without; scales very small. *Corolla*-lobes rounded, the tips incurved, ·075 to ·1 in. long, glabrous. *Corona* of rounded, incurved processes alternate with the corolla-lobes, with bearded short ridges below them half-way down the tube. *Anthers* short; appendages erect, rounded, membranous; pollen-masses oblong, attached to the pollen-carriers by very short or almost no caudicles. *Style-apex* fleshy, globose-conical. *Follicles* 3 in. long, ovoid, turgid, beaked, woody, cordate at base; pericarp glabrous. *Seeds* large, ·7 in. long, flat, elliptic, broadly winged, the wing membranous. Wight Contrib. 45; Dene. in DC. Prodr. VIII. 622; Miq. Fl. Ind. Bat. II. 499; Hook. f. Fl. Br. Ind. IV. 30; Prain Beng. Plants 694. *Cynanchum acuminatum*, Herb. Ham. *Asclepias acuminata*, Roxb. Hort. Beng. 21, and Fl. Ind. II. 55.

KEDAH : Langkawi Island, *Curtis* 2811. MALACCA : *Griffith*; *Maingay* (K.D.) 1109.—DISTRIB. India (Eastern Bengal and Chittagong), Burma, Java.

2. GYMNEMA LACTIFERUM, Br. in Mem. Wern. Soc. Edinb. I. 33 (1808); Wight Contrib. 44; Dene. in DC. Prodr. VIII. 622; Hook. f. Fl. Br. Ind. IV. 30; Trimen Fl. Ceyl. III. 154. *G. zeylanicum*, Dene. in DC. l. c. *Asclepias lactifera*, Linn. Sp. Pl. 216.

VAR. *nitens*, Hook. f. Fl. Br. Ind. IV. 31. A twining shrub; branchlets smooth, dark brown, glabrous, the uppermost pubescent. *Leaves* membranous when dry and reddish brown; ovate-lanceolate, acuminate at apex, acute at base; glabrous on both surfaces or the midrib and nerves beneath pubescent; margins recurved; 2 to 4 in. long, ·75 to 1·5 in. broad; midrib slender; main nerves about 6 pairs, curving acutely upwards to an irregular intramarginal nerve, not prominent; reticula-

tions faint; petiole slender, .3 to .4 in. long. *Cymes* in pairs, opposite, alternate with the leaves, minutely pubescent; umbels racemose, with minute persistent bracts 10- to 12-flowered; peduncles .25 in. long; pedicels slender, .1 to .15 in. long; buds ovoid. *Calyx*-lobes ovate with scarious margins, .05 in. long; glands 5, subulate, black. *Corolla* .075 in. long; lobes as long as tube, rounded. *Corona* of 5 pairs of bearded ridges on the corolla-tube alternate with the lobes, and with small rounded incurved tips. *Anther*-appendages rounded, minutely erose; pollen-masses spatulate, connected by short jointed rounded caudicles to the oblong pollen-carriers. *Style-apex* globose. *Fruit* not seen. *G. nitens*, Blume Mus. Bot. I. 149, t. 29; Miq. Fl. Ind. Bat. II. 498. *G. Malayanum*, Griff. Notul. IV. 56, and Ic. Pl. Asiat. t. 394.

PENANG: *Curtis*. PERAK: *Scortechini* 2007. MALACCA: *Maingay* (K.D.) 1110.—DISTRIB. Sumatra, Borneo (*Motley* 383).

3. *GYMNEMA MAINGAYI*, Hook. f. Fl. Br. Ind. IV. 31 (1883). A slender much twining undershrub; branchlets finely tawny-pubescent; the bark papery. *Leaves* membranous when dry; ovate-acuminate at apex, cordate at base; both surfaces pubescent; the hairs with bulbous bases, yellow when dry; margins slightly recurved; 1 to 2 in. long, .75 to 1 in. broad; midrib prominent, impressed above, sometimes with a small gland at the base; main nerves 4 to 5 pairs arching upwards and anastomosing near the margin; reticulations not easily visible; petiole .125 to .25 in. long, curved, easily detached at the base. *Cymes* subsessile, pubescent; the peduncle when present short, thickened; pedicels slender, .1 to .2 in. long; bracts most minute; buds oblong-conical. *Calyx* deeply cleft, pubescent without; lobes oblong, obtuse, .05 in. long; scales invisible. *Corolla* campanulate; tube .075 in. long; lobes ovate, .025 in. long, glabrous, thickened. *Corona* of small fleshy obtuse scales in the sinuses of the corolla-lobes, and a decurrent hairy ridge below extending about half-way down the tube. *Staminal-column* columnar; anther-wings long; appendages rounded, short, scarious; pollen-masses clavate, connected by very short jointed caudicles to the nearly globose pollen-carriers. *Style-apex* dome-shaped, much exceeding the anthers. *Fruit* not known.

MALACCA: *Maingay* (K.D.) 1111.

4. *GYMNEMA TINGENS*, Wight Contrib. 45 (1834). A slender climbing shrub; branchlets dark brown, slender, smooth, somewhat thickened at the nodes. *Leaves* membranous when dry; ovate-acuminate at apex, rounded shallowly cordate or (when young) slightly cuneate at base; both surfaces glabrous, olive-green when dry; margins slightly recurved; 2.5 to 6 in. long, 1 to 3 in. broad; midrib slender, raised beneath; main nerves 5 to 8 pairs, the lowest 2 to 3 pairs rather close



together and more spreading than the rest; reticulations many, obscure; petiole slender, .75 to 1.5 in. long, channelled above. *Cymes* as long as or shorter than the petioles, axillary between the leaves, puberulous; peduncles slender, .5 to .75 in. long; branches few, short, much thickened, bracteate, bearing spirally racemose many-flowered umbels; pedicels capillary, .5 in. long; buds conical; flowers pale yellow. *Calyx*-lobes oblong, .15 to .2 in. long, ciliate; glands 5, very small. *Corolla*-tube .1 in. long, pubescent within; lobes .15 in. long, narrowly oblong, obtuse, glabrous. *Corona* of thickened hispidly bearded broad ridges inside the corolla-tube a little way below the sinuses of the lobes; no free scales at the sinuses. *Staminal-column* slender, .15 in. long; appendages ovate, membranous, erect; pollen-masses oblong-clavate, attached to the ovoid pollen-carriers by very short clavate caudicles. *Style-apex* elongate, clavate, much exceeding the anther-column. *Follicles* solitary, slender, straight or very slightly curved, 5 to 6 in. long, .4 to .5 in. broad, point acuminate; pericarp smooth, ribbed. *Seeds* elliptic, flat, .5 in. long, .3 in. broad, with a broad wing, base obtuse, apex slightly produced and truncate, surmounted by a white silky coma 1.5 in. long; testa thin, dark brown; cotyledons elliptic, .15 in. long; radicle cylindric, .075 in. long. Wall. Cat. 8190; Hook. f. Fl. Br. Ind. IV. 31; Prain Beng. Plants 694. *G. tingens* var. *cordifolia*, Wight Ic. t. 593. *Bidaria tingens*, Dcne. in DC. Prodr. VIII. 623, partly. *Asclepias tingens*, Roxb. Hort. Beng. 21, and Fl. Ind. II. 53.

PERAK: at Ulu Bubong, 400 to 600 feet, clinging to large trees, King's Collector 10242; at Chandleriang under 300 feet, *ib.* 5747.—  
DISTRIB. India, Burma.

## 21. GONGRONEMA, Dcne.

Twining shrubs or undershrubs. *Leaves* opposite. *Flowers* small, in sessile or pedunculate or branching cymes, often umbelliform, in one of the axils of a pair of leaves, often with thickened tuberculate bracteate rachises (as in *Hoya*). *Calyx* 5-partite, glandular or eglandular within. *Corolla* urceolate subrotate or broadly campanulate; the lobes narrowly overlapping to the right (valvate in *G. Wrayi*). *Corona*-processes 5, adnate to the staminal-column near the base, usually small and rounded, sometimes large, erect. *Staminal-column* inserted at the base of the corolla, short; anther-appendages membranous, inflexed over the style-apex; pollen-masses solitary in each cell, erect, ovoid, waxy, attached by slender curved caudicles to rather large ellipsoid pollen-carriers. *Ovary* of 2 carpels; style short; style-apex conical or convex. *Fruit* of 2 (more usually 1) smooth, acuminate follicular mericarps. *Seeds* comose.—DISTRIB. Species about 10; Asiatic, African, and Australian.

Corolla urceolate; cymes shorter than the petioles; corona rounded, more or less adherent to the staminal-column:—

Leaves rounded at base; caudicles of pollinia curved, slender 1. *G. Wallichii*.

Leaves cordate at base; caudicles of pollinia clavate .. 2. *G. Curtisii*.

Corolla campanulate; cymes longer than the petioles; corona ligulate, angularly bent upwards; caudicles slender, straight .. 3. *G. bracteolatum*.

Corolla campanulate, almost hypocrateriform; cymes shorter than the petioles; corona dorsally flattened below, radically flattened above; caudicles long, much curved .. 4. *G. Wrayi*.

1. GONGRONEMA WALLICHII, Dene. in DC. Prodr. VIII. 624 (1844). A small twining shrub; branchlets slender, pale brown, smooth. *Leaves* firmly membranous; elliptic-oblong or -lanceolate, shortly acuminate at apex, rounded at base; both surfaces glabrous, the lower paler; margins slightly recurved; 3 to 6 in. long, 1 to 2 in. broad; midrib slender, impressed above, raised beneath, with a small tuft of glands at the base just above the petiole; main nerves 5 to 6 pairs, arched upwards to meet in a prominent intramarginal looped nerve; secondary nerves and reticulations few, irregular; petiole .5 to .75 in. long, slender, twisted. *Cymes* subsessile, racemiform, few-flowered, shorter than the petioles, on a stout rachis tuberculate with many persistent small rounded imbricate bracts; pedicels slender, .1 to .15 in. long; buds globose. *Calyx*-lobes ovate-acute, scarious, .05 in. long; scales 5, minute. *Corolla* urceolate; tube .1 in. long, nearly globose, minutely hairy within; teeth acuminate, erect or spreading, .05 in. long. *Corona*-processes broad, somewhat incurved, rounded at the tip from a broad base, adherent to the base of the staminal-column, fleshy. *Staminal-column* short; appendages membranous, acuminate; pollen-masses oblong-ovoid, attached by slender curved caudicles to the ovoid pollen-carriers. *Style*-apex shortly 5-lobed, with a conical apiculus. *Follicles* slender, straight or gently curved, linear-lanceolate, acuminate, 6 in. long, .3 to .4 in. broad; pericarp smooth. *Seeds* ovate, spatulate, flattened, .3 to .35 in. long, twisted, with a broad wing. Miq. Fl. Ind. Bat. II. 500; Hook. f. Fl. Br. Ind. IV. 33. *Gymnema Wallichii*, Wight Contrib. 46; Wall. Cat. 8195A.

PROVINCE WELLESLEY: Ridley 7029. MALACCA: Griffith (K.D.) 3770; Maingay (K.D.) 1113.—DISTRIB. Borneo (*Haviland* 3503).

2. GONGRONEMA CURTISII, King & Gamble, n. sp. A slender small twining shrub; branchlets pale brown, slender, smooth; innovations tawny-pubescent. *Leaves* membranous when dry; elliptic-lanceolate or -obovate, broadly acuminate at apex, shortly cordate at base; tawny-pubescent on both surfaces when young, glabrescent when older, except on the margins and midrib, under surface pale grey; 2.5 to 3 in. long, .75 to 1.5 in. broad; midrib broad, prominent beneath, with

a small glandular tuft at the base just above the petiole; main nerves 5 to 6 pairs, very faint, curved upwards to a faint intramarginal nerve; reticulations not distinguishable; petiole slender, .5 to .75 in. long, twisted at base. *Cymes* shorter than the petioles, pubescent, sessile or very shortly pedunculate, 2-flowered with a thickened bracteate rachis; pedicels slender, .05 to .1 in. long; buds globose-conical; flowers pale green. *Calyx*-lobes ovate-acute, pubescent, ciliate, .075 in. long; scales about 10. *Corolla* urceolate; tube .15 in. long, pubescent within; lobes oblong, acute, spreading, twisted, .1 in. long. *Corona*-processes rounded, curved downwards, attached to the base of the anthers, columnar, fleshy. *Anthers* short; appendages erect, membranous, triangular-ovate; pollen-masses oblong-ovoid, waxy, attached by slender slightly clavate caudicles to the rather large ovate pollen-carriers. *Style-apex* of a 5-lobed flattened ring, surrounded by a large rounded conical apiculus. *Fruit* not known.

PENANG: on West Hill at 2000 ft., *Curtis* 1545. PERAK: at Lower Camp, Gunong Batu Patch, *Wray* 1011.

3. *GONGRONEMA BRACTEOLATUM*, King & Gamble, n. sp. A small twining shrub; branchlets rather stout, brown, uppermost minutely puberulous. *Leaves* coriaceous; oblong-lanceolate, acuminate at apex, cordate at base; when young puberulous, when old glabrescent, except on the midrib; margins recurved; 3 to 6 in. long, 1.25 to 1.75 in. broad; midrib rather stout, keeled above, furnished with a tuft of small glands at the base just above the petiole; main nerves 6 to 7 pairs, acutely curving upwards to join in a looped intramarginal nerve; reticulations obscure; petiole .75 to 1 in. long, curved. *Cymes* longer than the petioles, racemose, on .5 to .75 in. long, thickened, many-bracted rachises at the ends of the peduncles; peduncles thick, woody, .5 in. long; pedicels .15 to .2 in. long; bracts ovate-acute; buds conical; flowers yellow. *Calyx*-lobes ovate-acute, glandular, ciliate, scarious, .05 in. long; scales 10, minute. *Corolla* campanulate, broad; tube .1 in. long, pubescent within; lobes triangular, ovate-acute, spreading, .15 in. long. *Corona*-processes attached to the back of the staminal-column at its lower part, thick, fleshy, ligulate, bent in the middle and curving over the top of the staminal-column and style-apex. *Anthers* with a short, membranous, acuminate, incurved appendage; pollen-masses ovoid, attached by slender straight caudicles to the rather large pollen-carriers. *Style-apex* annular, obscurely 5-lobed; the apiculus convex. *Fruit* not known.

PERAK: at Goping, *King's Collector* 721.

4. *GONGRONEMA WRAYI*, King & Gamble, n. sp. A slender twining undershrub; branchlets terete, yellowish, very flexuous. *Leaves* coriaceous, bright green, ovate, bluntly acuminate at apex, rounded and

almost cordate at base; both surfaces glabrous, shining; margins recurved; 2·5 to 4 in. long, 1 to 1·75 in. broad; midrib stout, impressed above, raised beneath, with a large gland at its base; main nerves 5 to 7 pairs, at about 70° with the midrib, nearly straight at first, then often branched, joining an irregular looped intramarginal nerve; secondary nerves many, similar, but not meeting the sinuses of the intramarginal nerve; reticulations irregular, usually branched towards the midrib; petiole slender, ·5 to ·75 in. long. *Cymes* axillary, umbellate, about 5- to 6-flowered, shorter than the petioles; peduncle thick, about ·1 in. long; bracts triangular, small; pedicels ·1 in. long, puberulous; flower-buds conical; flowers yellow. *Calyx* cup-shaped, pubescent without; lobes orbicular, ciliate, ·075 in. long; scales minute. *Corolla* thick, campanulate, almost hypocrateriform; tube cylindric, ·15 to ·2 in. long, glabrous on both surfaces; lobes triangular, valvate, stellately spreading, nearly as long as tube. *Corona* of 5 erect processes adnate to the backs of the anthers, very fleshy, ovate, glabrous, dorsally flattened and concave below, radially flattened and rounded at apex, much longer than the staminal-column. *Staminal-column* short; filament-tube nearly free from the corona; anther-cells parallel; appendages scarious, ovate-acute, incurved over the style-apex; pollen-masses ellipsoid, granular, attached by very slender long curving caudicles to the small conical pollen-carriers. *Style-apex* 5-angled, thick, depressed, with a conical apex. *Fruit* not known.

PERAK: at Relan Tujor, Wray 2243.

## 22. MARSDENIA, Br.

Climbing, rarely erect, shrubs or undershrubs. *Leaves* opposite. *Flowers* small or of moderate size, in umbelliform cymes or in small sessile umbels or clusters scattered along the branches of the cymes or of panicles, which are lateral at the nodes or axillary. *Calyx* 5-partite, with 5 to many glandular scales at the base within, sometimes eglandular. *Corolla* campanulate or urceolate; lobes 5, overlapping to the right. *Corona*-processes 5, membranous or fleshy, arising from the staminal-column, the basal part adnate to it, the apical part free; often of two lobes one above the other. *Staminal-column* arising from or near to the base of the corolla; anthers erect, with membranous appendages more or less incumbent over the style-apex; pollen-masses erect, solitary in each anther-cell, oblong, waxy, attached in pairs by moderately stout caudicles to the ovate horny pollen-carriers. *Ovary* of 2 carpels; style short; style-apex large, usually more or less hollowed above and then expanding into a convex or conical or depressed tip. *Fruit* of 2 (more usually 1 only, by abortion) lanceolate or poniard-



shaped follicular mericarps; pericarp thick, smooth or wrinkled, or sometimes winged. *Seeds* comose.—**DISTRIB.** About 70 species: in the tropics of both hemispheres, one South European.

- Plant turning blue in drying; flowers small, in clusters in a thyrsoid panicle; corolla campanulate, lobes short, with tufts of hair at the mouth; corona-processes subulate-acuminate, longer than the anthers .. .. . 1. *M. tinctoria*.  
 Plant brown when dry; flowers in pedunculate corymbose cymes; corolla tubular-campanulate, lobes linear, glabrous; corona-processes 2-lobed, outer flattened, inner acute, shorter than the anthers .. .. . 2. *M. Scortechinii*.  
 Plant greenish-brown when dry; flowers in clusters in a long spike or raceme; corolla urceolate, lobes lanceolate; corona-processes none or small, and then adnate to the anthers .. 3. *M. thyrsoflora*.  
 Plant greyish when dry; flowers in pedunculate umbels; corolla rotate, lobes broadly rounded; corona-processes large, round, fleshy, with an acute beak shorter than, or equal to, the anthers .. .. . 4. *M. volubilis*.

1. **MARSDENIA TINCTORIA**, Br. in Mem. Wern. Soc. Edinb. I. 30 (1808). A climbing shrub; stem stout, smooth; branchlets slender, smooth, uppermost pubescent, the whole plant when dry having a blueish-black tinge. *Leaves* membranous when dry; ovate or ovate-oblong, shortly and abruptly acuminate, sometimes long caudate-acuminate at apex, rounded or cordate at base; both surfaces finely pubescent when young, afterwards glabrous; 3 to 9 in. long, 1 to 3 in. broad; midrib slender, usually pubescent, furnished above at the base and partly on the petiole with a group or string of small glands; main nerves 7 to 8 pairs, not conspicuous, straight or slightly curved, usually at about 50° with the midrib; reticulations transverse, slender, obscure; petiole slender, puberulous, .75 to 1.25 and even 2 in. long, twisted and curved in the middle. *Cymes* in densely flowered interrupted clusters along or on the branches of a thyrsoid panicle reaching 3 to 6 in. in length and .5 to 1 in. in diam., grey-puberulous; peduncles .5 to 1.5 in. long; pedicels slender, .15 in. long; buds ovate; flowers yellow, blue when dry. *Calyx*-lobes ovate, pubescent without, ciliate, 3- to 5-nerved, membranous, .05 in. long; glandular scales 5, minute. *Corolla* cylindric-campanulate; tube slightly constricted at mouth, furnished within with 5 lines of retrorse stiff hairs .075 in. long; lobes rounded, erect or spreading in flower, .025 to .05 in. long, each furnished within with a tuft of stiff bristles. *Corona*-processes membranous; the apex subulate-acuminate, longer than the anthers. *Anthers* with membranous incurved appendages; pollen-masses oblong, attached by long somewhat clavate

caudicles to the rather small pollen-carrier. *Style-apex* annular, 5-rayed; the top depressed with a very short umbo. *Follicle* 1, pendulous; linear-lanceolate, 3 in. long, .5 in. in diam., somewhat gibbous at base, acuminate and slightly hooked at tip; pericarp pubescent. *Seeds* compressed, ovate, shortly beaked, .5 in. long, .25 in. broad, with a narrow wing. Wight Contrib. 40, and Icones t. 519; Wall. Cat. 8173; Griff. Notul. IV. 52, and Ic. Pl. Asiat. t. 389; Dene. in DC. Prodr. VIII. 615; Miq. Fl. Ind. Bat. II. 491; Hook. f. Fl. Br. Ind. IV. 34; Brandis For. Fl. 332; Kurz For. Fl. II. 201; Prain Beng. Plants 696. *M. monostachya*, Wall. MSS. *Asclepias tinctoria*, Roxb. Hort. Beng. 20, and Fl. Ind. II. 43. *Pergularia tinctoria*, Spreng. Syst. I. 844. *P. parviflora*, Blume Bijdr. 1056. *Cynanchum tingens*, Hort. Ham.

KEDAH: King's Collector 1731. PERAK: Ridley 9672 (in very young fruit and in some respects slightly different-looking); *Scortechini* 1299.—DISTRIB. India (Sikkim, Assam, and E. Bengal), Burma, Sumatra, Java, Borneo, China.

The description of the fruit requires verification for the Malay Peninsula.

2. *MARSDENIA SCORTECHINII*, King & Gamble, n. sp. A twining shrub; branchlets very slender, pale brown. *Leaves* membranous when dry; ovate, long-acuminate at apex, rounded or cordate at base; both surfaces slightly puberulous when young, afterwards glabrous, brown when dry; 2 to 3 in. long, 1 to 1.5 in. broad; midrib slender, with a tuft of small glands at the base above the petiole; main nerves 5 to 7 pairs, curving upwards to anastomose near the margin; reticulations many, transverse and netted; petiole slender, .5 to 1 in. long, twisted. *Cymes* axillary between the petioles, pedunculate, corymbose, puberulous, about 1 in. long and broad; peduncles .5 in. long; flowers very many; buds conical-acuminate; pedicels .15 in. long; bracts ovate-acuminate. *Calyx*-lobes oblong, acute, membranous, ciliate, .1 in. long; scales 5, minute. *Corolla* tubular-campanulate; tube .1 in. long, glabrous within; lobes linear-oblong, .15 in. long, glabrous. *Corona*-processes membranous, bifid; outer lobe flattened, rounded; inner erect, acute, shorter than the anther-column. *Anthers* with prominent cells; appendages membranous, acute, erect; pollen-masses large, oblong, attached by rather short caudicles to the rather large ovate, channelled, pollen-carriers. *Style-apex* rounded at top, bearing a rather large dome-shaped apex. *Fruit* not known.

PERAK: at Tjuk, *Scortechini* 1162.

3. *MARSDENIA THYRSIFLORA*, Hook. f. in Fl. Br. Ind. IV. 37 (1883). A climbing shrub; branches pale brown, terete; uppermost branchlets minutely puberulous. *Leaves* membranous; broadly ovate or deltoid-

ovate, acuminate at apex, deeply (often 1 to 1·25 in.) cordate at base, the sinus ·5 to ·75 in. broad; glabrous on both surfaces on young leaves only, slightly puberulous on the nerves beneath; 4 to 8 in. long, 2 to 6 in. broad; midrib rather broad with a cluster of small glands at its base; main nerves 5 to 7 pairs, the lowest 1 to 2 pairs in the basal lobes deflexed, the others curving upwards to anastomose near the margin; reticulations slender, prominent; petiole 1 to 3·5 in. long, terete. *Cymes* lateral, 4 to 6 in. long, puberulous, spicate or racemose; rachis flexuous, somewhat flattened; flowers in clusters of about 3 to 6 on a tubercular base; bracts small, acute; pedicels slender, ·1 in. long; buds ovoid. *Calyx* deeply cleft; lobes ovate-lanceolate, obtuse, the margins hyaline; scales long, subulate. *Corolla* urceolate, glabrous without and within; lobes short, much thickened, lanceolate. *Corona*-processes none, or reduced to a rounded film attached to the back of the anthers. *Stamens* with small spurs to the anthers; appendages long, acuminate, connivent over the style-apex. *Style-apex* 5-lobed, flat, with a fusiform tip. *Follicles* (usually 1 only) lanceolate, 2 in. long, ·25 in. broad, recurved, acuminate; pericarp thinly coriaceous, smooth, glabrous. *Seeds* ovate, ·2 in. long, ·1 in. broad, broadly winged; coma short, white-silky; testa very thin, pale brown; cotyledons elliptic, ·025 in. long; radicle as long as cotyledons. Prain Beng. Plants 696. *M. tinctoria* in part, Herb. Hook. f. and Th.

PAHANG: at Talian river, *Ridley* 2414.—DISTRIB. India (Assam, Khasia Hills, jheels of Lower Bengal).

4. *MARSDENIA VOLUBILIS*, T. Cooke, Fl. Bomb. II. 166 (1904). A stout climbing shrub with rough brown corky bark; branchlets pale brown with occasional lenticels; innovations whitish-puberulous. *Leaves* somewhat coriaceous when fresh, membranous when dry; broadly ovate or suborbicular, acuminate at apex, cordate or truncate or rounded, occasionally slightly cuneate at base; young leaves minutely tomentose, especially on the under surface, afterwards glabrous, ashy grey when dry; 2·5 to 6 in. long, 1·75 to 4·5 in. broad; midrib stout, raised beneath, furnished with a few small glands in a cluster at the base adjoining the petiole; main nerves also raised beneath, 4 to 6 pairs, the lowest 2 pairs from close by the base, spreading and curving upwards; reticulations prominent, usually raised, larger ones transverse; petiole ·5 to 1·5 in. long, stout or slender. *Cymes* umbellate, glabrous or mealy-pubescent, many-flowered; peduncles 1 to 2 in. long, slender, arising from between the petioles; bracts ovate-acuminate, sometimes leafy; pedicels slender, ·25 to 1 in. long; buds globose, depressed; flowers bright green. *Calyx*-lobes ovate-oblong, obtuse, ciliolate, ·1 in. long; glandular scales 5, minute, between the lobes. *Corolla* rotate,

deeply divided; tube .1 to .15 in. long; lobes rounded, rather longer, glabrous without and usually within. *Corona*-processes large, fleshy, rounded, with a short beak extending over the top of the staminal-column and style-apex. *Staminal-column* arising from the base of the corolla; appendages membranous, ovate, obtuse, arching over the stigma; pollen-masses oblong-spathulate, large, waxy, attached by short thick caudicles to the linear-oblong pollen-carriers. *Ovary* of 2 pubescent carpels; style-apex dome-shaped. *Follicles* 2 (or 1, by abortion), broadly lanceolate, tapering to a blunt point, divaricate in a straight line, 3 to 4 in. long, 1 in. broad; pericarp smooth, yellow, mealy when young. *Seeds* broadly ovate, .5 in. long, .3 in. broad, broadly winged; the tip truncate, with a 2 in. long coma of white silky hairs; testa smooth, shining; cotyledons ovate, .3 by .2 in., flat; radicle .1 in. long. *Dregea volubilis*, Benth. Gen. Pl. 775 ex Hook. f. Fl. Br. Ind. IV. 46; Trimen Fl. Ceyl. III. 161; Prain Beng. Plants 697. *Hoya viridiflora*, Br. in Mem. Wern. Soc. Edinb. I. 27; Wight Contrib. 39, and in Hook. Bot. Misc. II. 98, t. 1, and Ic. t. 586; Wall. Cat. 8168; Dalz. & Gibs. Bomb. Fl. 153; Griff. Ic. Pl. Asiat. t. 387, 388. *Asclepias volubilis*, Linn. f.; Roxb. Fl. Ind. ii. 36. *Apocynum tiliaefolium*, Lamk. Encycl. I. 214. *Wattakaka viridiflora*, Hassk. in Flora 1857, 79. "*Watta-kaka-codi*," Rheede Hort. Mal. IX. t. 15.

SIAMESE STATES: Pulau Badak, *Curtis* 2997.—DISTRIB. India, Ceylon, Java.

The only Malay specimen available is a poor one, with small umbels and flowers smaller than in the usual Indian forms, but the structure agrees with the latter.

### 23. PERGULARIA, Linn.

Twining shrubs. *Leaves* opposite. *Flowers* of moderate size, numerous, in pedunculate or subsessile umbelliform cymes, lateral between the bases of the petioles. *Calyx* 5-partite; scales within 5 or none. *Corolla* hypocrateriform; tube inflated at the base; lobes 5, erect, overlapping to the right. *Corona* of 5 erect processes arising from the base of the staminal-column and adnate to it in the lower part, free above and with a narrow or subulate process on the inner face. *Staminal-column* arising from the base of the corolla; anthers oblong, erect, with long erect membranous appendages conniving over the apex of the style; pollen-masses solitary in each anther-cell, erect, attached in pairs to the pollen-carriers by very short caudicles. *Ovary* of 2 carpels; style not exceeding the anther-appendages; style-apex stout, ovoid-pentagonal. *Follicles* lanceolate, terete, rather turgid. *Seeds* ovate, concave, comose.—DISTRIB. About 10 species, chiefly Indian and Malayan, one in Tropical and South Africa.



PERGULARIA PUBERULA, Miq. Fl. Ind. Bat. II. 495 (1856). A twining shrub; branchlets slender, terete, puberulous as are the innovations. *Leaves* membranous; ovate or oblong-ovate, acuminate at apex, rounded or shallowly cordate at base, puberulous when young, when older only on the nerves; 3 to 5 in. long, 2 to 3 in. broad; midrib slender, with a tuft of minute glands at the base above the petiole; main nerves 6 to 7 pairs, the lowest 2 pairs rather close together, the rest distant, curving upwards to anastomose near the margin; reticulations transverse, prominent on the lower surface; petiole slender, puberulous, 1 to 1·5 in. long. *Cymes* umbelliform, in pairs on the top of a ·5 to 2 in. long peduncle, puberulous, many-flowered; bracts minute, subulate; pedicels slender, ·25 to ·5 in. long; buds oblong-conical. *Calyx* membranous; lobes ovate-obtuse, unequal, ·05 to ·1 in. long, puberulous, ciliate on the margins; scales obscure. *Corolla* pubescent without; tube ·25 in. long, inflated below, slightly contracted at the mouth; lobes linear-oblong, obtuse, hispidly ciliate, as long as tube. *Corona*-processes laterally compressed, 2-winged below, beaked above, the inner face with a subulate curved appendage arching over the anthers and longer than them. *Pollen*-masses oblong, obtuse, attached a little above their bases by very short stout caudicles to the bifid pollen-carriers. *Style-apex* rounded-conical. *Fruit* not known. Hook. f. Fl. Br. Ind. IV. 38.

PENANG: *Phillips*; at Penara Bakit, *Curtis* 932.—DISTRIB. Java (*Horsfield, Kurz*).

*P. minor*, Andr. Bot. Rep. t. 184, is a garden species found in cultivation in India and Malaya, and prized for its greenish-yellow scented flowers. Its native home is uncertain. MALACCA: *Griffith*.

## 24. STEPHANOTIS, THOUARS.

Twining shrubs, often long-scandent. *Leaves* opposite, coriaceous. *Flowers* in umbelliform axillary pedunculate cymes, usually large, white and sweet-scented. *Calyx* 5-partite, with large lobes; glandular scales usually none. *Corolla* hypocrateriform; tube long, cylindric, inflated at the base; lobes twisted, overlapping to the right. *Corona* of 5 processes, adnate to the back of the anthers, flattened, sometimes none. *Staminal-column* arising from the base of the corolla; anthers erect, with erect or inflexed membranous appendages; pollen-masses solitary in each anther-cell, erect, attached in pairs to the carriers by very short caudicles. *Ovary* of 2 carpels; style short; style-apex conical or shortly beaked, hardly or not exerted. *Fruit* of 2 very thick, obtuse or acuminate, follicular mericarps. *Seeds* comose.—DISTRIB. About

15 species, chiefly from Madagascar, a few from the Malay Archipelago and China.

*STEPHANOTIS MAINGAYI*, Hook. f. Fl. Br. Ind. IV. 39 (1883). A stout, long-scandent, climbing shrub; branchlets stout, pale brown, puberulous with retrorse curved tubercular hairs. *Leaves* coriaceous, chartaceous when dry; ovate or ovate-oblong, acuminate at apex, shortly cordate at base; both surfaces glabrous and yellow when dry; margins recurved; 4 to 6 in. long, 2 to 3 in. broad; midrib slender but prominent, raised beneath; main nerves 8 to 10 pairs, the lowest pair nearly at right angles to the midrib, the rest at about 45°, nearly straight, joining towards the margin in a looped intramarginal nerve; reticulations distant, transverse; petiole pubescent, .5 to 1 in. long; *Cymes* few-flowered; peduncle 1 to 3 in. long, stout; bracts small, subulate-acuminate; pedicels stout, puberulous, .75 to 1.5 in. long; buds elongate-clavate; flowers pale sulphur-yellow, large, fragrant, 2.5 in. in diam. *Calyx* glabrous, except at extreme base; tube very short; lobes oblong-lanceolate, acute, 3-nerved with netted reticulations, .75 in. long, .3 in. broad; scales none. *Corolla*-tube 1 in. long, thick, with 5 thick ridges within opposite the anthers, the hollows between the ridges filled with brown stiff retrorse bristles; lobes slightly longer than the tube or equal to it, ovate-lanceolate, acuminate, spreading. *Corona* none. *Staminal-column* in all .5 in. long, stout, on a thickened base; anther-wings horny; appendages pale, oblong, obtuse; pollen-masses oblong, with very short scarcely apparent caudicles. *Style-apex* capitate, flattened, on a short column supported by a thickened ring. *Fruit* not known.

MALACCA: climbing extensively over trees, *Maingay* (K.D.) 1112. SINGAPORE: *Hullett* 147.

## 25. TYLOPHORA, Br.

Erect or twining perennials. *Leaves* opposite. *Flowers* small, lateral between the bases of the petioles or axillary, in simple or branched cymes of flower-clusters or short racemes, or sometimes in sessile flower-clusters at the nodes of the stem. *Calyx* 5-partite, 5-glandular within. *Corolla* rotate or rotate-campanulate, deeply 5-lobed, the lobes slightly overlapping to the right. *Corona* of 5 small fleshy tubercular processes, adnate to or radiating from the filament part of the staminal-column and arising from near its base. *Staminal-column* arising from the base of the corolla; anthers erect, small, with small membranous appendages; pollen-masses very minute, erect, sub-erect or horizontal, attached by their middle or near their base to very slender caudicles by which they are affixed in pairs to the pollen-

carriers. *Ovary* of 2 carpels; style-apex pentagonal or 5-lobed, depressed, flattened or convex, rarely slightly exceeding the anthers. *Fruit* of 2 (or by abortion 1) follicular mericarps, smooth, acute or acuminate, sometimes inflated or winged. *Seeds* comose.—**DISTRIB.** About 40 species: widely distributed in the tropical and subtropical regions of the Old World and Australia.

Leaves and branches and cymes glabrous; corona-processes globose, without free points above; calyx glabrous:—

Flowers rather large, .3 in. broad at least; leaves usually over 2 in. long:—

Corona-processes globose, shorter than the anthers; leaves 2.5 to 6 in. long .. .. 1. *T. longifolia*.

Corona-processes globose, as long as the anthers; leaves 1 to 3 in. long .. .. 2. *T. globifera*.

Flowers very small, .1 in. broad; leaves under 2 in. long .. 3. *T. tenuis*.

Branches and inflorescence more or less pubescent; calyx pubescent:—

Corona-processes globose, without free tips above; foliicles where known slender, acuminate:—

Leaves glabrous; corolla very small .. .. 4. *T. exilis*.

Leaves tomentose; corolla about .3 in. broad .. .. 5. *T. hirsuta* var. *penangensis*.

Corona-processes with small free points above; foliicles broad, ventricose, obtuse:—

Leaves 3 to 6 in. long, not or very slightly cordate at base .. 6. *T. Wallichii*.

Leaves 5 to 7 in. long, deeply cordate at base .. 7. *T. perakensis*.

1. **TYLOPHORA LONGIFOLIA**, Wight Contrib. 50 (1834). A slender twiner; stems pale brown, glabrous, striate when dry. *Leaves* membranous when dry; ovate-lanceolate or oblong-lanceolate, acuminate at apex, rounded or slightly cordate at base; glabrous on both surfaces; 2.5 to 6 in. long, .75 to 1.75 in. broad; midrib slender, raised beneath, with a tuft of minute glands at the base just above the petiole; main nerves 7 to 8 pairs, the lowest 2 pairs close to the base, the rest sharply curved upwards to and along the margin, all raised beneath; reticulations scanty, transverse; petiole slender, .5 to .75 in. long, pubescent in the channel on the upper surface. *Cymes* paniculate, glabrous, lateral between the leaf-petioles, up to 4 in. long; peduncles slender, 1 to 2 in. long; branches divaricate, slender; flower-clusters distant, umbellate, 2- to 5-flowered; pedicels capillary, .2 to .3 in. long; buds ovoid; flowers rather large, up to .4 in. in diam., yellowish-green or red. *Calyx* glabrous; lobes lanceolate, .025 in. long; scales minute. *Corolla* rotate; tube very short; lobes oblong-lobtuse, 5- to 7-nerved, membranous, .1 in. long. *Corona*-processes dilated, globose, shorter

than the anthers. *Anthers* broad; appendages short, incurved; pollen-masses ovoid, horizontal, attached by minute straight caudicles to the slightly spurred pollen-carriers. *Ovary* of 2 carpels; style-apex pentagonal, tip convex. *Follicles* 2, divaricate at right angles, lanceolate, poniard-shaped, long-acuminate, 3·5 to 4·5 in. long, ·25 in. broad; pericarp thin, smooth. *Seeds* oblong, broadly winged, ·4 to ·5 in. long, ·15 to ·2 in. broad, base rounded; tip broadly truncate, bearing a white silky coma 1·5 in. long; testa thin, dark brown, smooth; cotyledons elliptic, ·075 in. long, nerved; radicle cylindric, ·05 in. long. Wall. Cat. 8205; Dcne. in DC. Prodr. VIII. 608; Hook. f. Fl. Br. Ind. IV. 42.

PERAK: on Maxwell's Hill, 3500 ft., *Wray* 4185; do. *Ridley* 5514; *Scortechini*; at 3500 to 4000 ft., *King's Collector*, 3317, 3318, 6301; at Cottage Hill, 4000 to 6000 ft., *Curtis* 145, 2087.—DISTRIB. India (Sikkim, Khasia Hills, Sylhet).

2. TYLOPHORA GLOBIFERA, Hook. f. Fl. Br. Ind. IV. 41 (1883). A slender, glabrous, twining undershrub; branchlets glabrous, terete. *Leaves* membranous; ovate or ovate-lanceolate, acuminate at apex, rounded or slightly cordate at base; both surfaces glabrous, smooth; margins slightly recurved; 1 to 3 in. long, ·5 to 1·5 in. broad; midrib slender, raised beneath; main nerves 4 to 7 pairs, at first nearly straight, then curving to join in an intramarginal looped nerve; petiole ·25 to ·5 in. long, slender. *Cymes* long-peduncled, compressed, few-flowered, more or less umbellate; peduncles about 1 in. long; bracts lanceolate-acuminate; pedicels filiform, ·5 to ·75 in. long; buds ovoid, depressed; flowers blue (*Kunstler*). *Calyx* glabrous; lobes ovate-lanceolate, ·1 in. long. *Corolla* ·3 in. in diam., cleft half-way down; lobes ovate, ·15 in. long, prominently nerved. *Corona*-processes globose, large, as high as the anthers. *Anther*-appendages short, crenate, incurved over the style-apex; pollen-masses ellipsoid, horizontal, joined by straight caudicles to the small oblong pollen-carriers. *Style-apex* 5-lobed; tip convex. *Fruit* not known.

PERAK: banks of Bernam river, *King's Collector* 8853. MALACCA: *Griffith* 3764.—DISTRIB. Andaman Islands, Borneo.

3. TYLOPHORA TENUIS, Blume Bijdr. 1062 (1826). A slender twiner; stems much branched, very slender, glabrous; the nodes pubescent, the internodes sometimes only. *Leaves* somewhat fleshy when fresh, membranous when dry; variable in shape, ovate-elliptic or -oblong or -lanceolate, acute or apiculate at apex, rounded or slightly cordate at base; margins recurved; ·75 to 2 in. long, ·25 to 1 in. broad; midrib slender, puberulous above; main nerves 4 to 5 pairs, indistinct, nearly straight to join an intramarginal looped nerve; reticulations obscure;



petioles .25 to .5 in. long, puberulous in the channel on the upper side. *Cymes* from between the petioles, very slender, paniculate, glabrous, reaching 4 to 5 in. in length; rachis filiform, flexuose, its branches divaricate, finally bearing few-flowered subumbellate racemes; pedicels filiform, .25 to .5 in. long; bracts minute, lanceolate-subulate; buds globose; flowers dark purple. *Calyx* glabrous; lobes lanceolate, .025 in. long. *Corolla* rotate; tube short; lobes ovate-oblong, obtuse, 3-nerved. *Corona*-processes inflated, somewhat annular-globose, as long as the filaments. *Anthers* slender; appendages very short, incurved; pollen-masses minute, horizontal, ovoid, attached by straight caudicles to the rather slender pollen-carriers. *Ovary* of 2 carpels; style-apex pentagonal, top convex. *Follicles* 1 or 2, 2 to 3 in. long, lanceolate, poniard-shaped, long-acuminate; pericarp membranous, smooth. *Seeds* ovate, .2 to .25 in. long, broadly winged, dentate below, truncate at tip, and bearing a white silky coma .75 to 1 in. long; testa dark brown, striate, sparsely tubercular; cotyledons elliptic, radicle cylindric, both together .05 to .1 in. long. Dene. in DC. Prodr. VIII. 608; Miq. Fl. Ind. Bat. II. 488; Hook. f. Fl. Br. Ind. IV. 42; Trimen Fl. Ceyl. III. 158; Cooke Fl. Bomb. II. 162; Prain Beng. Plants 698. *T. carnos*a, Wall. in Wight Contrib. 49; Wall. Cat. 8200; Wight Ic. t. 351; Dene. in DC. l. c. 607; Miq. l. c. 488. *T. tenuissima*, Wight Contrib. 47, and Ic. t. 588; Dalz. & Gibs. Bomb. Fl. 150; Dene. in DC. l. c. 607. *Asclepias tenuissima*, Roxb. Hort. Beng. 20, and Fl. Ind. II. 41. *A. dichotoma*, Rottl. in Wall. Cat. 8200 B.C. *Ceropegia Decaisneana*, Miq. Pl. Hohenack. 634.

PENANG: Curtis 1526. PERAK: Wray 2125; Scortechini; King's Collector 6099, 10600. MALACCA: Griffith; Maingay (K.D.) 1108, 1139. JOHORE: Ridley 4030, 9162. SINGAPORE: Ridley 5746; Kunstler 113, 266.—DISTRIB. India, Burma, Ceylon, Java, Borneo (Haviland 3060).

4. TYLOPHORA EXILIS, Colebr. in Trans. Linn. Soc. XII. 358, t. 16 (1817). A slender twiner; branchlets pale brown, terete, slender, puberulous. *Leaves* chartaceous when dry; ovate-oblong or -lanceolate, shortly and abruptly acuminate at apex, rounded at base; glabrous on both surfaces; margins recurved; 2 to 3 in. long, 1 to 1.5 in. broad; midrib slender, impressed above, raised beneath, with a few minute glands at its base; main nerves 4 to 6 pairs, the lowest 2 pairs close together, the rest distant, curving upwards to meet in a looped intra-marginal nerve raised above; secondary nerves few; reticulations obscure; petiole slender, .5 to 1 in. long, articulate at the base. *Inflorescence* longer than the leaves, up to 4 in. long, puberulous; rachis slender, flexuous, simple or rarely branched, bearing at its nodes umbellately racemose flower-clusters, the clusters many-flowered; bracts

minute, persistent; pedicels slender, .1 to .15 in. long; buds very small, globose; flowers light brown. *Calyx* pubescent without; lobes ovate acute, ciliate, .04 in. long; scales minute. *Corolla* rotate, very small, glabrous, membranous; lobes .05 in. long, 3-nerved. *Corona*-processes inflated, obtuse, shorter than the anthers. *Anthers* slender; appendages short, membranous; pollen-masses ovoid, attached by very short straight caudicles to the minute slightly spurred pollen-carriers. *Ovary* of 2 carpels; style-apex pentagonal, flat, very slightly convex at tip, *Follicle* 1, subulate, acuminate, 3 to 4 in. long, .25 in. broad; pericarp chartaceous, smooth, glabrous. *Seeds* ovate-oblong, .25 to .35 in. long, .1 in. broad, slightly contracted above below the broad truncate tip, which bears a white silky coma .75 to 1 in. long, denticulate at base, broadly winged; testa brown, thin, shining, striate; cotyledons elliptic, .1 in. long, 3-nerved; radicle cylindric, .05 in. long. Wight Contrib. 50; Wall. Cat. 8206; Dene. in DC. Prodr. VIII. 608; Hook. f. Fl. Br. Ind. IV. 44; Prain Beng. Plants 698. *Pergularia exilis*, Spreng. Syst. I. 844.

PERAK: at Kota, Wray 2417, 3053; King's Collector 6470. DINDINGS: on Pangkore Island, *Scortechini* 1035. MALACCA: Griffith 3764.—DISTRIB. India (Assam, Sylhet, Chittagong).

5. *TYLOPHORA HIRSUTA*, Wight Contrib. 49 (1834); Wall. Cat. 8201; Dene. in DC. Prodr. VIII. 607; Hook. f. Fl. Br. Ind. IV. 43. *T. Jacquemontii*, Dene. l. c. *Gymnema hirsutum*, Wall. Tent. Fl. Nep. 50.—DISTRIB. India (Himalaya from Kumaon eastwards, Eastern Bengal).

VAR. *penangensis*, Hook. f. in Fl. Br. Ind. IV. 43. A climbing shrub; branchlets densely ferruginous tomentose. *Leaves* subcoriaceous; ovate or ovate-lanceolate, acuminate at apex, attenuate, rounded, or somewhat cordate at base; both surfaces ferruginous-tomentose, the hairs with bulbous bases; 2 to 4 in. long, 1 to 1.75 in. broad; midrib rather stout; main nerves 4 to 6 pairs, curved upwards to and along the margin; reticulations netted; petiole .5 to .75 in. long, densely tomentose. *Cymes* ferruginous-villous, much branched, 1 to 5 in. long; branches dichotomous; flowers in racemiform clusters on enlarged many-bracteate rachises; bracts ovate-acuminate; pedicels very slender, .25 to .5 in. long. *Calyx*-lobes pubescent, very small, .3 in. long, ovate-acute. *Corolla* deeply cleft; lobes triangular-ovate, acute, .1 in. long. *Corona* of 5 subglobose processes on the backs of the anthers and shorter than them. *Anther*-appendages short, incurved; pollen-masses nearly globose, horizontal, attached by slender slightly curved caudicles to the oblong pollen-carriers. *Style-apex* 5-angled, included within the anthers. *Fruit* not seen. *T. mollissima*, Wall. Cat. 8202.

PENANG: *Phillips*; at Waterfall stone-quarry, *Curtis*.—DISTRIB. China? *Wallich* 8202 (cult. in Hort. Calc.).

After examining specimens at Kew, we prefer to leave this plant in its present rather doubtful position, rather than to accept the suggestion in Fl. Br. Ind. that it may be *T. villosa*, Blume, of Java. Its place will probably have to be reconsidered when better specimens are available.

6. *TYLOPHORA WALLICHII*, Hook. f. Fl. Br. Ind. IV. 45 (1883). A slender twining shrub; branchlets slender, terete, younger puberulous. *Leaves* thickly coriaceous when green, chartaceous when dry; ovate-lanceolate or ovate-oblong, acuminate at apex, rounded or slightly cordate at base; both surfaces glabrous except the nerves beneath when young; margins slightly recurved; 3 to 6 in. long, .5 to 2 in. broad; midrib rather stout, raised beneath, with a few minute glands at the base above the petiole; main nerves 6 to 8 pairs, curving upwards to join in a rather obscure intramarginal looped nerve; reticulations transverse, obscure; petiole slender, puberulous, .75 to 1 in. long, articulate at the base. *Inflorescence* lateral from between the bases of the petioles, often longer than the leaves, divaricately branched, subsessile or on peduncles .5 to .75 in. long; branches slender, long; flower-clusters racemose, pubescent, with many minute ovate-acute sheathing persistent bracts; pedicels capillary, .3 to .4 in. long, pubescent; buds globose; flowers pale yellow. *Calyx* membranous; lobes ovate-oblong, acute, .5 in. long, ciliate, pubescent without; scales minute. *Corolla* rotate-campanulate; tube .05 in. long; lobes ovate-oblong, acute, .1 in. long, thin, 5-nerved. *Corona*-processes thick, rounded, fleshy, ending in a cuspidately acute point, reaching to the level of the style-apex. *Anthers* narrow; appendages very short; pollen-masses very minute, nearly globose, attached by very slender straight caudicles to the minute pollen-carriers. *Style-apex* pentagonal; top convex. *Follicle* 1, recurved to the horizontal, 3.5 to 4 in. long, 1 in. broad, oblong-ellipsoid ventricose, obtuse at the tip; pericarp light green, pale brown and chartaceous when dry and longitudinally striate. *Seeds* flattened, .5 in. long, broadly ovate, with a broad wing; testa brown, shining; tip truncate, bearing a 1 in. long white silky coma; cotyledons broadly ovate, 3-nerved, .15 to .2 in. in diameter; radicle cylindric, .075 in. long. *Gymnema Wallichii*, in part, Wight Contrib. 46. *G. sagittatum*, Wall. Cat. 8194B.

PENANG: in Pulau Betong Reserve, *Curtis* 933. PERAK: *Wray* 3047; *King's Collector* 5259, 5439. MALACCA: *Griffith*; *Maingay* (K.D.) 1142. SINGAPORE: *Wallich* 8194B.

7. *TYLOPHORA PERAKENSIS*, King & Gamble, n. sp. A climbing shrub; branches stout, fleshy; branchlets smooth, striate, pale brown

when dry; internodes long. *Leaves* membranous when dry; ovate, acuminate at apex, deeply cordate at base; glabrous on both surfaces; 5 to 7 in. long, 2 to 3 in. broad; midrib slender, raised beneath, bearing a small cluster of glands at the base just above the petiole; main nerves 9 to 10 pairs, the lowest 1 or 2 pairs decurved into the basal lobes, the rest curving upwards to anastomose near the margin in an obscure looped nerve; reticulations few, transverse, prominent when dry; petiole fleshy, glabrous, 1 to 3 in. long, articulate at the base. *Inflorescence* lateral from between the petioles, as long as or longer than the leaves, divaricately branched, glabrous; peduncles stout, 1 to 1.5 in. long; branches long, slender; flower-clusters umbellate, 6- to 8-flowered; bracts minute, usually soon deciduous; pedicels capillary, .1 to .2 in. long; buds ovoid; flowers green. *Calyx* pubescent without; lobes ovate-acute, .075 in. long, ciliate; scales subulate. *Corolla* campanulate-rotate; tube short; lobes oblong-obtuse, 5-nerved, thickened, minutely pubescent above. *Corona*-processes nearly globose, fleshy, shorter than the anthers; point small, appressed to the anthers, acute. *Anthers* slender above; appendages acuminate, incurved; pollen-masses nearly globose, very minute, attached by slender straight caudicles to the minute pollen-carriers. *Style-apex* pentagonal, top convex. *Follicle* 1, ventricose, only slightly recurved, 5 to 6 in. long, 1.5 in. broad, oblong, very obtuse at tip; pericarp light green and glossy when fresh, chartaceous when dry, striate longitudinally; dissepiments fibrous-crustaceous. *Seeds* flattened, .5 in. long, broadly ovate, with a broad wing; testa brown, shining; tip with a .75 in. long white silky coma; cotyledons broadly ovate, 3-nerved, .15 in. long; radicle cylindric, .075 in. long.

PERAK: at lower camp, Gunong Batu Pateh, 3400 ft., Wray 1227; in open jungle at 200 to 300 ft., King's Collector 5761, 7178, 8343; at Ipoh, Curtis 3186.—DISTRIB. Borneo (Teysmann 11578; Motley 625).

This species comes very near to *T. Wallichii*, but is much larger and more glabrous, has more deeply cordate leaves, a larger inflorescence with umbellate instead of racemose flower-clusters, a less beaked corona and longer anther-appendages. Curtis' No. 3186 has one inflorescence with the flower-clusters racemose and the others umbellate, and seems to come between the two species, but in other respects it belongs to this.

## 26. HETEROSTEMMA, W. & A.

Twining shrubs. *Leaves* opposite, often 3- to 5-nerved at the base. *Flowers* small, in lateral sessile or pedunculate umbellate or racemose cymes. *Calyx* 5-partite. *Corolla* campanulate, urceolate or rotate; lobes triangular, valvate or slightly overlapping to the right. *Corona*



of 5 thin or fleshy processes spreading more or less horizontally from the staminal-column, usually with an erect tubercle on the upper side; the tips flat or dentate or laciniately cleft. *Staminal-column* short, depressed; the anthers minute, ending in a small membranous appendage; pollen-masses 1 in each anther-cell, subquadrate or rounded, sometimes with a thin margin on the inner side, erect, sessile or attached by very short caudicles to the pollen-carriers. *Ovary* of 2 carpels, distinct or combined; style-apex pentagonal, flat, not exerted beyond the anthers. *Fruit* of 2 distinct or adherent slender straight follicular mericarps. *Seeds* thin, winged, comose; the margin recurved.—DISTRIB. About 10 species, Indian and Malayan.

Corolla rotate-campanulate; corona thin, long, entire or laciniate,

spreading horizontally; leaves truncate or cordate at base .. 1. *H. piperifolium*.

Corolla ovoid-urceolate; corona thick, short, much fimbriate,

more or less erect; leaves cuneate at base .. 2. *H. fimbriatum*.

1. *HETEROSTEMMA PIPERIFOLIUM*, King & Gamble, n. sp. A slender twining shrub; branchlets pale, terete, slightly channelled when dry, uppermost very minutely puberulous. *Leaves* membranous when dry, 3- to 5-nerved; triangular-ovate, acuminate at apex, broadly truncate at base, sometimes slightly decurrent; both surfaces minutely puberulous, the lower the most; 2·5 to 3·5 in. long, 1·5 to 2·5 in. broad; midrib slender, furnished at the base with 1 or more rather conspicuous glands; main nerves 4 pairs, the lowest 2 pairs from the base, the first pair very small, the second strong and with the others curving upwards to join near the margin; reticulations few, obscure, irregular; petiole slender, twisted, .75 to 2 in. long. *Cymes* few-flowered, umbellately racemose, on stout .5 to .75 in. long peduncles; the rachis of the raceme thickened, with minute bracts; pedicels slender, .25 in. long; buds globose, depressed; flowers yellow. *Calyx*-lobes ovate, .05 in. long, ciliate, the margins hyaline; scales minute. *Corolla* rotate-campanulate, .3 in. broad, puberulous without, the base short at first, then spreading, divided about half-way down; lobes triangular, incurved. *Corona*-processes spreading, lying flat on the corolla, .1 in. long, linear-lanceolate, entire or variously laciniate, the upper part with a slight rounded protuberance or nearly flat. *Staminal-column* short; appendages membranous, curved over the style-apex; pollen-masses erect, waxy, flattened on the inner, curved on the outer edge, sessile on the triangular-elongate pollen-carrier. *Carpels* distinct; style-apex thin, flattened, 5-gonal. *Follicles* slender, long-acuminate, recurved to about 3 right angles, 4 to 5 in. long, .15 to .2 in. broad; pericarp thin, smooth. *Seeds* ovate-oblong, very thin, with broad thin margins; apex bearing a .75 in. long white silky coma; testa very thin, brown.

PERAK: at Kwala Dipang, *Ridley* 9619; at Larút, 200 to 500 ft., *King's Collector* 2338, 7973; at Ijuk, *Scortechini* 1097, 1150.

At first sight this species closely resembles *H. chrysanthum* (*Symphysicarpus chrysanthus*, Hassk.), but differs completely in the corona and in the very divaricate follicles.

VAR. *cordatum*, King & Gamble. *Leaves* cordate to a depth of about .4 in.; main nerves 5 to 6 pairs, the basal pairs 3, of which the lowest much deflexed in the lobes of the leaf. *Corona*-lobes usually entire. Rest as in the type.

PERAK: *Scortechini*. Only one rather poor specimen of this is available.

2. *HETEROSTENMA FIMBRIATUM*, King & Gamble, n. sp. A twining shrub; stems pale brown, with 2 longitudinal lines of hairs. *Leaves* fleshy, chartaceous when dry; oblong or oblong-lanceolate, acuminate at apex, cuneate at base; both surfaces glabrous, lower pale; margins slightly recurved; 3.5 to 4.5 in. long, 1.5 to 2 in. broad; midrib stout, raised beneath when dry, furnished with a cluster of rounded glands at the base above the petiole; main nerves 5 pairs, prominent and raised when dry, with a slender obscure pair in addition from the very base, the second pair from about .25 in. above the base, all obliquely curved upwards to join in a looped intramarginal nerve; reticulations not visible even when dry; petiole stout, .5 to .75 in. long, much curved and swollen at the base. *Cymes* racemose, on short (.15 in.) very stout peduncles; the rachises of the racemes about .3 in. long, thick, strobilate, with cushion-like bracts; pedicels slender, angular, .5 in. long, puberulous; buds rather large, ovoid-orbicular. *Calyx* very small; lobes minute, ovate-acute, ciliate. *Corolla* ovoid-urceolate, thick, fleshy, pubescent without, glabrous within, .3 to .4 in. long, divided at most to one-third of its length in triangular lobes slightly overlapping to the right and erect. *Corona*-processes nearly erect, attached to the staminal-column, thick, fimbriate at the tips in 2 rows of subulate teeth. *Staminal-column* short; anther-cells rounded; appendages very small, membranous, bifid; pollen-masses rounded, with a thin straight margin on the inner side, nearly horizontal, sessile on a triangular pollen-carrier. *Carpels* distinct, elongate; style-apex 5-gonal, tip concave. *Fruit* not known.

PERAK: at G. Ijub, *Scortechini* 1220.

Only one rather poor specimen of this is available. The plant seems to be an *Oianthus*; but that genus—as suggested by Hooker in the Fl. Br. Ind., and by Bentham in his remarks to Ic. Pl. t. 1191, under *O. urceolatus*, Benth., to which this species is very close—seems scarcely separable from *Heterostenma*. In many ways our species strongly resembles *H. alatum*, Wight.

27. HOYA, Br.

Twining pendulous (rarely erect) or rambling and rooting, often epiphytic, shrubs. *Leaves* opposite, usually thick and fleshy or coriaceous. *Flowers* in axillary, lateral or terminal, umbelliform, racemose cymes, usually on a thickened tuberculate rachis, sessile or pedunculate. *Calyx* small, 5-partite, with 5 glandular scales. *Corolla* rotate or rotate-campanulate, fleshy or waxy; lobes 5, often convex or spreading or reflexed, valvate in bud. *Corona*-processes 5, large, fleshy-membranous or horny, adnate to the staminal-column; the lower lobe stellately spreading or ascending, turgid or compressed, often concave on the upper surface; the upper lobe usually produced into a tooth or process which is erect and incumbent on the anther. *Staminal-column* usually short, arising from the base of the corolla; anthers conniving over the style-apex, membranous; appendages membranous, erect or inflexed; pollen-masses 1 in each anther-cell, erect, waxy, usually flattened, often thickened on the outer margin, attached by caudicles of various shapes, usually short, sometimes enlarged thickened or cup-shaped, sometimes long, to the horny hard pollen-carriers. *Ovary* of 2 distinct carpels; style-apex 5-angled, tip flattened or conical-apiculate. *Fruit* of 1 or 2 follicular mericarps, usually slender with a thin pericarp, rarely turgid with a thick one. *Seeds* small, oblong or ovate, comose; cotyledons flattened, thick; radicle cylindric.—DISTRIB. About 70 species, found in Tropical Asia and Australia.

Corolla reflexed, lobes longer than broad :—

Staminal-column stipitate; corona-processes with long narrow lobes, the upper erect, the lower horizontal with usually upcurved tip (Sect. I. CYBROTERAS) .. .. 1. *H. multiflora*.

Staminal-column sessile; corona-processes inflated :—

Corona-processes with lower lobe ovoid, laterally compressed; upper lobe, smaller, rounded, erect; corolla-tube densely villous (Sect. II. PTEROSTELMA) .. .. 2. *H. lasiantha*.

Corona-processes with lower lobe globose, hollow; upper shorter-curved; corolla-tube with a broad annular ring (corolline corona ?) (Sect. III. KLOIOPHORA) .. .. 3. *H. Curtisii*.

Corolla spreading, lobes spreading or incurved, rarely reflexed, broader than long; staminal-column sessile or subsessile; corona-processes with lower lobes spreading, upper acute (Sect. IV. EUHOYA) :—

Corona with lower lobes of processes obtuse :—

Lower lobes suberect, laterally compressed; leaf-nerves horizontal :—

Lower lobes rounded, inflated; upper lobes acuminate; stems thick; leaves thick, fleshy, over 4 in. long :—

Flowers yellow; corolla under 1·5 in. in diam. .. 4. *H. obtusifolia*.

- Flowers dark purple; corolla much over 1·5 in. in diam. 5. *H. imperialis*.  
 Lower lobes beaked; upper lobes short, acute; stems slender; leaves thin, under 4 in. long .. 6. *H. elliptica*.  
 Lower lobes horizontal or nearly so, flattened above; leaf-nerves usually at an acute angle with the midrib:—  
 Flowers large, reaching 1·5 in. in diam.; leaves velvety pubescent beneath; caudicles of pollen-masses long, slender, twisted .. 7. *H. coronaria*.  
 Flowers small, rarely ·5 in. in diam.; leaves glabrous beneath; caudicles short, usually thick:—  
 Lower lobe of corona very thick and blunt vertically, upper short; leaves ovate-lanceolate, cordate, faintly nerved .. 8. *H. Scortechinii*.  
 Lower lobe of corona thin vertically, short:—  
 Leaves obscurely nerved, about 3 to 4 pairs, very thick; lower corona-lobes obtuse; upper long, acuminate; appendages very long acuminate .. 9. *H. caudata*.  
 Leaves prominently 3- to 5-nerved, very thick; peduncles many from the axils; lower corona-lobes concave, obtuse .. 10. *H. latifolia*.  
 Leaves not 3-nerved from the base; peduncles usually 1 only at the axils:—  
 Leaves small; main nerves at right angles to the midrib, indistinct .. 11. *H. lacunosa*.  
 Leaves moderate-sized, under 4 in. long; elliptic or obovate; main nerves indistinct, at about 60° with the midrib; climber .. 12. *H. diversifolia*.  
 Leaves large, over 7 in. long, oblanceolate; main nerves prominent, as are reticulations; trailer, epiphytic .. 13. *H. Maingayi*.  
 Corona with lower lobes of processes acute or nearly so:—  
 Leaves with nerves easily visible when dry:—  
 Leaves with 5 basal nerves, the lowest pair faint .. 14. *H. parasitica*.  
 Leaves pinnately nerved:—  
 Flowers moderately large, ·5 in. in diam. in bud; leaves with not very conspicuous reticulations; follicles with very thick pericarp .. 15. *H. coriacea*.  
 Flowers small, ·25 in. in diam. in bud:—  
 Leaves large, usually over 5 in. in length and 1·5 in. in breadth; main nerves very prominent:—  
 Main nerves at 40° with the midrib; reticulations prominent, chiefly on upper surface, but not sharp 16. *H. Forbesii*.  
 Main nerves at 60° with the midrib; reticulations very prominent and sharp on both sides; follicles with thin pericarp .. 17. *H. Finlaysonii*.  
 Leaves moderate-sized, usually under 5 in. in length and 1·75 in. in breadth; main nerves nearly at right angles to midrib, rather faint on both surfaces .. 18. *H. Ridleyi*.  
 Leaves with nerves not or very faintly visible when dry:—



Flowers minute; corolla rarely over .15 in. in diameter;  
pedicels filiform: -

Leaves lanceolate, margins only slightly recurved .. 19. *H. parviflora*.

Leaves ovate or ovate-lanceolate, margins very strongly  
recurved .. .. 20. *H. revoluta*.

Flowers moderate-sized; corolla .4 in. broad; pedicels  
thick, broadly flattened when dry; leaf-margins slightly  
recurved .. .. 21. *H. plicata*.

Corolla rotate-campanulate; lobes very short, broader than long;  
corona-processes with lower lobes spreading, upper erect  
(Sect. V. *CYSTIDIANTHUS*):—

Flowers rather large; corolla over 1 in. broad; leaves rather  
large, with conspicuous nerves; shrubby, apparently not root-  
ing along the stems .. .. 22. *H. campanulata*.

Flowers small; corolla .3 in. broad; leaves small, with nerves  
not or scarcely visible; slender, rooting all along the stems . 23. *H. Wrayi*.

1. *HOYA MULTIFLORA*, Blume Cat. Hort. Buit. 49 (1823), and Bijdr. 1064. An epiphytic undershrub, rooting from the branches on the bark of trees; branches stout, smooth, pale, glabrous. *Leaves* coriaceous, membranous when dry; oblong or oblong-lanceolate, acuminate at apex, acute at base; both surfaces glabrous, more or less shining; margins reflexed; 3 to 8 in. long, 1 to 2 in. broad; midrib stout, raised beneath when dry; main nerves 7 to 10 pairs, the lowest pair faint, close to the margin, the rest curving upwards to and along the margin where they join in loops; secondary nerves few or none; reticulations transverse, irregular, netted, more obvious on the upper surface; petiole stout, .5 to .75 in. long. *Umbels* racemose, many-flowered (40 to 50), on a stout tubercular bracteate nearly globose rachis at the end of an interpetiolar peduncle; peduncle stout, 1 to 2 in. long; pedicels slender, 1.5 to 2 in. long; flowers white tipped with yellow or yellow tipped with brown, with waxy-white corona. *Calyx* membranous, cleft about two-thirds down; lobes oblong, .075 in. long; scales rounded, flattened. *Corolla* rotate, completely reflexed when open; tube minutely bearded at base, .2 in. long; lobes triangular, .25 in. long, with small folds in the sinuses. *Corona* of 5 horny glabrous processes, with erect upper lobes, conical, longer than the anthers and a horizontal or upcurved horn-like lower lobe at the base, each about .15 to .2 in. long. *Staminal-column* .3 in. long, stipitate; anthers erect or slightly inflexed; appendages very small, inflexed; pollen-masses oblong, .05 in. long, with a narrow thin outer margin, attached by short cup-like caudicles to the narrow usually clavate pollen-carriers. *Style-apex* conical-apiculate at tip. *Follicle* 1, slender, pendulous, 7 to 8 in. long, .3 in. broad; pericarp thin, smooth. *Seeds* small, oblong, .25 in. long, narrowly winged above on both sides, broadly truncate, with a 2 in. long white silky coma; testa very thin, brown;

cotyledons oblong, 0·75 in. long; radicle cylindric, ·05 in. long. Hook. f. Fl. Br. Ind. IV. 52. *H. coriacea*, Lindl. Bot. Reg. 1839, t. 18, *not of Blume*. *Cyrtoceras multiflorum*, Benn. in Herb. Horsf.; Miq. Fl. Ind. Bat. II. 514. *Cyrtoceras reflexum*, Benn. in Horsf. Pl. Jav. Rar. 90, t. 21; Ridley in Trans. Linn. Soc. Ser. 2, III. 321. *C. floribundum*, Maund Botanist, IV. t. 178. *Centrostemma multiflorum*, Dene. in Ann. Sc. Nat. Ser. 2, IX. 272, and in DC. Prodr. VIII. 634; Blume Mus. Bot. Lugd.-Bat. I. 45; Hassk. Flor. Bot. Zeit. IX. (1845) 250; Bot. Mag. t. 5173. *C. Lindleyanum*, Dene. in DC. l. c.

PENANG: (drawing in Herb. Kew); at Gunong Pulai, 1800 ft., *G. King*. PERAK: at Tea Gardens, *Curtis*; at Gunong Kelidang, *Ridley* 9739; at Birjay Malacca, and Gunong Haram Paroh, *Scortechini* 635, 1905; on tree branches in forest, 1000 to 3000 ft., *King's Collector (Kunstler)* 2423, 7297. MALACCA: on Mount Ophir, *Maingay* (K.D.) 1123.—DISTRIB. Burma (Boronga Island, Arracan, *Kurz*), Java, Borneo, Philippine Islands.

2. HOYA LASIANTHA, Korthals in Miq. Fl. Ind. Bat. II. 526 (1856). A climbing and perhaps epiphytic undershrub; branchlets rather stout, smooth, yellowish when dry. *Leaves* thinly fleshy when fresh, chartaceous when dry; elliptic or lanceolate, cuspidate-acuminate at apex, acute or rounded at base; both surfaces glabrous, upper shining; margins slightly recurved; 4 to 6 in. long, 1 to 2·5 in. broad; midrib slender, impressed above, raised beneath, with a small pit or gland just above the petiole; main nerves prominent, impressed above, 8 to 10 pairs, at an angle of 50° to 60° with the midrib, curving upwards to and along the margin, the upper ones forming a looped intramarginal nerve; reticulations netted, most prominent on the upper surface; petiole stout, ·5 to ·75 in. long. *Umbels* 8- to 12-flowered, on short tubercular rachises at the ends of stout axillary or lateral peduncles 1 to 3 in. long; pedicels slender, 1·5 to 2 in. long, glabrous; flowers orange-yellow with white soft hairs, the corona ochreous-yellow, shining. *Calyx* membranous, hyaline with dark nerves; lobes ovate to nearly orbicular; scales subulate. *Corolla* about ·8 in. broad when spread open; tube very short; lobes lanceolate-acuminate, densely white-villous at their base, recurved in flower. *Corona* of 5 shining processes, horny when dry, adnate to the lower part of the anthers; the lower lobe ovoid, somewhat laterally flattened, inflated, cleft beneath into two wings; the upper also erect, tongue-like, rounded. *Staminal-column* moderately long; anthers closely appressed to the upper lobe of the corona, cells slightly divergent; appendages scarious, broad, obtuse; pollen-masses rather long, waxy, flattened, oblong, attached by short, rather thick, cup-like caudicles to the conical pollen-carriers. *Style-apex* 5-angled, tip conical, acumi-

nate. *Follicle* 1, slender, 7 in. long, about .25 in. broad, nearly horizontal; pericarp thin, striate. *Seeds* .2 in. long, elliptic with a short neck, truncate at tip, bearing a white silky coma 1.5 in. long; cotyledons fleshy, elliptic, .1 in. long; radicle cylindric, .05 in. long. N. E. Brown in Gard. Chron. XVIII. 333 (1882), fig. 57. *Plocostemma lasianthum*, Blume in Rumph. IV. 30, and Mus. Bot. Lugd.-Bat. I. 60, t. XIV.; Bot. Mag. t. 5081.

PERAK: *Scortechini* 605. SELANGOR: at Semenyeh, *Goodenough* for *Ridley* 8194.—DISTRIB. Java, Borneo (*Korthals*).

The cultivated specimen imported from Borneo, represented in Bot. Mag. t. 5081, and that collected by Curtis at Wyncoop's Bay, Java, and figured by N. E. Brown in the 'Gardeners' Chronicle,' appear to differ somewhat from the Malay Peninsula specimens in having larger leaves cordate at the base and rather larger flowers. But we fail to find any difference in the structure of the flowers. Another Java specimen (*Curtis* No. 61) which was sent to Messrs. Veitch & Co., agrees well with the Peninsular plants.

3. HOYA CURTISII, King & Gamble, n. sp. A twining small epiphytic undershrub, rooting at almost all the nodes on the bark of trees or on rocks; branchlets slender, pubescent. *Leaves* sessile, very thick; orbicular, abruptly triangular-acuminate at apex, rounded or sometimes very slightly attenuate at base; both surfaces scabrous-puncticulate when dry; margin thickened; .4 to .7 in. long, .4 to .6 in. broad; midrib when dry faint, other nerves invisible; petiole none. *Umbels* sessile, terminal or axillary, 10- to 16-flowered, on a .25 in. long tubercular rachis; pedicels slender, pubescent, .75 to 1 in. long; flowers rather large. *Calyx* with very short tube or almost none; lobes oblong, ciliate, villous without, membranous, .1 in. long, much recurved; scales minute. *Corolla* also much recurved; tube very short, with an annular spreading ring (or corolline corona?) a little above the base; lobes spatulate, acute at the tip, minutely scurfy-puberulous, .25 in. long. *Corona*: corolline (see above), annular; staminal, of 5 cucullate processes nearly globose when closed, but formed of 3 lobes, the two side ones rounded, the upper ovate, the three enclosing a cavity, and the whole corona much overtopping the staminal-column. *Staminal-column* short and shortly stipitate, attached at the base of the corolla-tube; anther-cells much divergent; appendages ovate, membranous, dentate; pollen-masses oblong-obtuse, about .03 in. long, attached by oblong fleshy thick caudicles to the conical pollen-carriers. *Style-apex* shortly 5-angled, somewhat depressed; tip bifid, very short. *Fruit* not known.

PERAK: at Waterloo, 2000 ft., *Curtis* 2894.

4. HOYA OBTUSIFOLIA, Wight Contrib. 38 (1834). A climbing (epiphytic?) shrub, with stout fleshy branches reaching .5 in. in diameter

and smooth puberulous bark. *Leaves* very thick, fleshy; oblong, rounded or emarginate and usually apiculate at apex, rounded or cordate at base; both surfaces shining, glabrous except on the midrib; margins recurved; 4 to 6 in. long, 2 to 3 in. broad; midrib very thick, channelled and pubescent above, raised and glabrous or puberulous beneath; nerves visible only when dry and then main nerves seen to be nearly horizontal, about 10 to 12 pairs, soon branching; petiole very thick, .5 to 1 in. long, puberulous. *Umbels* many-flowered, racemose, on thick tubercular rachises .5 to .75 in. long and up to about .4 in. in diam., at the ends of thick 1 to 3 in. long puberulous peduncles which are apparently lateral; pedicels rather thick, 1 to 1.5 in. long, puberulous, slightly enlarged below the calyx and dotted; buds 5-angled, acute at tip, .4 in. long; flowers dull yellow. *Calyx* fleshy; lobes linear-oblong, obtuse, recurved, .15 in. long, dotted and pubescent without. *Corolla* nearly 1 in. in diam. when open, pubescent without, glabrous within; lobes ovate-cordate-acuminate, generally erect, .4 in. long. *Corona* of 5 processes; the lower lobe suberect, obtuse, inflated, concave above and channelled beneath; the upper erect, longer than the anthers, acuminate. *Staminal-column* short; anther-cells parallel with small divergent wings below; appendages membranous, erect, acute; pollen-masses oblong, rounded, thin on the outer margin, attached by rather long curved caudicles to the rather large conical pollen-carriers. *Style-apex* obscurely 5-angled, obconical, long-apiculate. *Fruit* not known. Wall. Cat. 8167; Dene. in DC. Prodr. VIII. 638; Hook. f. Fl. Br. Ind. IV. 58. *H. Teysmanniana*, Miq. Fl. Ind. Bat. II. 522.

PENANG: ? Wallich 8167. PERAK: *Scortechini*. PAHANG: *Ridley* 2732. SINGAPORE: at Serangoon, on mangrove trees, *Ridley* 8932.—  
DISTRIB. Tenasserim or Andaman Islands (*Helfer* 3790), Sumatra (*Teysmann* 1170), Java.

The colour of the flowers seems to be a little in doubt. *Teysmann* gives it as "white," the Fl. Br. Ind. says "dull yellow," *Ridley* says "white with a red centre." It would seem therefore probable that the corolla is white turning yellow and the corona red.

5. HOYA IMPERIALIS, Lindl. in Bot. Reg. (1846) under t. 68, *in note*, and in Journ. Hort. Soc. V. 80 *with woodcut* (1850). A stout climbing shrub, rooting on trees and probably epiphytic; branches rounded, dark green, puberulous, punctulate and with papery bark when dry, reaching .5 in. in diam. *Leaves* fleshy or coriaceous, membranous when dry; elliptic or elliptic-oblong, obtuse or shortly acuminate or apiculate at apex, rounded at base or slightly cordate; both surfaces shining when dry,



glabrous above, puberulous or glabrate beneath; margins slightly recurved; 6 to 9 in. long, 1·5 to 2·5 in. broad; midrib stout and broad, pubescent on both sides; main nerves many, more than 12, but difficult to enumerate, nearly horizontal, at first straight, then branching and anastomosing; petiole ·25 to ·5 in. long, stout, pubescent. *Umbels* many-flowered (about 10), on short, often strongly tubercular and cushioned; rachises at the ends of stout pubescent axillary peduncles 3 to 10 in. long; pedicels stout, pubescent, 2 to 3 in. long; buds large, rounded above, produced below in 5 short recurved angles; flowers with corolla dark purplish-brown above, cinnamomeous beneath, the corona white or pale yellow. *Calyx* membranous, puberulous without, scurfy within; lobes ovate-ciliate, ·2 in. long; scales minute, triangular. *Corolla* leathery, 2 to 3 in. in diam.; the puberulous tube a little shorter than the ovate-triangular acute lobes, which are at first much incurved, afterwards spreading. *Corona* of 5 laterally compressed processes; the lower lobes erect, obtuse, deeply 2-cleft and pubescent in the clefts; the upper lobes also erect-subulate-acuminate. *Staminal-column* short, broad; anther-cells broad; appendages membranous, broadly winged, acuminate; pollen-masses flattened, oblong, truncate at both ends, ·075 in. long, attached by short slender caudicles to the thick, trigonous, horny, brown pollen-carriers. *Style-apex* pentagonal, the angles rounded below, ridged above, the ridges joining in an acuminate cone. *Follicle* 1, lanceolate-acuminate, 8 to 9 in. long, 1 in. broad; pericarp leathery, opening flat, at first puberulous, afterwards glabrous, striate when dry. *Seeds* obovate, flask-shaped, ·2 in. long, trigonous above, truncate at tip and bearing a silky white coma 2 in. long; testa corky, pale brown; albumen copious; cotyledons thick, ovate, cordate at base, ·1 in. long; radicle ·075 in. long, thick. Hook. Bot. Mag. t. 3397, copied in Fl. des Serres IV. tt. 393, 394; Ann. de Gand (1848) t. 228; Jour. Hort. Ser. 3, XXV. 485; Miq. Fl. Ind. Bat. II. 527; Hook. f. Fl. Br. Ind. IV. 59. *H. splendens*, Maingay MS. *Asclepias Sassuela*, Roxb. Fl. Ind. II. 31 (excl. syn.) ?

MALACCA : *Maingay* (K.D.) 1135.—DISTRIB. Borneo (*Beccari* 4001, *Motley* 1041).

6. HOYA ELLIPTICA, Hook. f. in Fl. Br. Ind. IV. 58 (1883). A slender twining undershrub; branchlets pale, terete, glabrous. *Leaves* fleshy (?) when fresh, chartaceous when dry; elliptic, obtuse both at apex and base; glabrous on both surfaces and pale, especially beneath; margin hardened, nerve-like, slightly recurved; 1·5 to 2·5 in. long, 1 to 1·5 in. broad; nerves prominent when dry; midrib slender; main nerves nearly at right angles to the midrib, irregular, 8 to 10 pairs, straight to join a prominent intramarginal looped nerve at ·1 to ·15 in. from the

edge, the said intramarginal nerve connected by many cross-nerves with the hardened marginal nerve; reticulations netted; petiole .15 to .25 in. long, flattened. *Umbels* racemose, about 8- to 10-flowered, on a short tubercular rachis at the end of a thickened pink peduncle reaching 1 in. in length; pedicels slender, 1 to 1.5 in. long, puberulous; buds .25 in. long, 5-angled, the incurved valvate corolla-lobes forming a central concavity; flowers "white" (Maingay), nearly black when dry. *Calyx* puberulous, pale pink; tube very short; lobes ovate-oblong, obtuse, .05 in. long; scales minute. *Corolla* .5 in. broad when open, glabrous without, sparingly pilose within; lobes obcordate, apiculate, inflexed (when dry). *Corona* of 5 processes; the lower and large lobes suberect, laterally compressed, bladder-like (the interior of the cavity delicately hairy), ovate, slightly apiculate; the upper short, flattened, slightly recurved, appressed to and covering the anther. *Staminal-column* attached to the base of the corolla-tube; anthers short, much inflexed so as to lie nearly horizontal; cells parallel above, divergent and empty below; appendages scarious, acute; pollen-masses oblong-falcate, pellucid on the outer margin, nearly horizontal, attached by thickened caudicles to the rather large elongate pollen-carriers which are obtuse above and 2-winged below. *Style-apex* 5-angled, flattened, with a short central umbo having 5 divergent rays to the angles. *Fruit* not known.

PERAK: *Scortechini*. MALACCA: *Maingay* (K.D.) 1137.

7. HOYA CORONARIA, Blume Bijl. 1063 (1825), and Rumph. IV. 31, t. 182, fig. 2 and t. 184 (fruit). A stout twining shrub, the upper branches giving out roots on to the bark of trees and probably therefore more or less epiphytic; branches thick, velvety pubescent, the innovations especially so. *Leaves* thickly coriaceous; elliptic elliptic-ovate or ovate-oblong, shortly acuminate at apex, rounded at base; upper surface when dry shining, wrinkled, puberulous especially on the midrib; lower surface pale brown, velvety-pubescent; margins strongly recurved; 3 to 4 in. long, 1 to 2 in. broad; midrib stout, impressed above, raised beneath; main nerves very obscure, about 5 to 7 pairs, nearly horizontal; reticulations not visible; petiole thick, velvety, .25 to .75 in. long. *Umbels* racemose, rather few-flowered, on thick rachises with large rounded tubercles .5 to 1.5 in. long, at the ends of thick lateral velvety peduncles .5 to .75 in. long; pedicels velvety, curved, thick, .5 to 1 in. long; buds depressed at top, the lobes decurved in a hook; flowers large, fleshy, about 1.5 in. in diam., greenish-white changing to ivory-white, then apparently to pink which darkens and becomes speckled with purple (Ridley); the corona white. *Calyx* thick, velvety without; lobes orbicular, .15 to .25 in. long; scales subulate. *Corolla* very thick, glabrous within, villous without; lobes triangular-

acuminate, cordate at base, .4 in. long. *Corona* of 5 spreading processes, horny when dry; the lower lobe nearly hemispherical, concave above, convex beneath, about .25 in. long; the upper acuminate, curved far over the anthers. *Staminal-column* short, thick, inserted at the base of the corolla-tube; anthers incurved, their cells parallel above, divaricate and empty below; appendages prominent, scarious, ovate-acute; pollen-masses broadly clavate, attached by means of long slender twisted caudicles to the rather large pollen-carriers which are rounded above and bifid below. *Style-apex* circular, saucer-shaped, with a small central umbo and 5 slender rays. *Follicle* 1, 6 to 10 in. long, 1.5 to .2 in. in diam., gibbous at base, subcylindric above, ending in an obtuse point; pericarp very thick, puberulous, striate; the endocarp woody and smooth; the follicle at length opening nearly flat. *Seeds* obovate, .4 in. long, truncate at tip and bearing a copious white silky coma 2 to 2.5 in. long; cotyledons elliptic, .2 in. long, fleshy; radicle cylindric, .1 in. long. Miq. Fl. Ind. Bat. II. 517; Hook. f. Fl. Br. Ind. IV. 58; Ridley in Trans. Linn. Soc. 2nd Ser. III. 321. *H. grandiflora*, Bl. MSS.; Dene. in DC. Prodr. VIII. 635. *H. velutina*, Wight Contrib. 35; Wall. Cat. 8150; Dene. l.c.

PENANG: ? Wallich 8150 (marked "Sillet," but probably in error); Curtis 236. DINDINGS: Curtis; Scortechini 1053. PERAK: at Goping, Scortechini 2009; at Matang, on sea coast, Wray 2710; at Larut, Kunstler 3865 (leaves only); King's Collector 4116, 6954. MALACCA: Griffith 3788; Maingay (K.D.) 1125. PAHANG: at Kwala Pahang, Ridley. SINGAPORE: at Serangoon, Ridley 2731A.—DISTRIB. Java, Sumatra (Teysmann 1171), Borneo (Motley 871, Burbidge), Celebes, New Guinea (H. O. Forbes 516, flowers 2 in. in diam.).

We have not quoted Hook. Bot. Mag. 4969, which in some respects seems to represent more nearly *H. obtusifolia* rather than this. As in other species, the colour of the flower is either very variable or in doubt. Low's drawing in Herb. Kew shows pink flowers, while Scortechini says they are white, Kunstler and Wray that they are "very pale yellow," and Maingay that they are "white or yellowish with purple spots."

8. HOYA SCORTECHINII, King & Gamble, n. sp. An epiphytic under-shrub, rooting at intervals on the bark of trees; branchlets slender, terete, pale brown. *Leaves* thick, fleshy, drying coriaceous; ovate or ovate-lanceolate, acuminate at apex, rounded or cordate at base; both surfaces glabrous, lower minutely glandular; margins recurved; 2 to 3.5 in. long, .75 to 1.25 in. broad; nerves only visible when dry; midrib thick; main nerves 5 to 6 pairs at an angle of 50° to 60° with the midrib, branching early and anastomosing near the margin; reticulations transverse; petiole stout, .2 in. long. *Umbels* apparently few-flowered,



on stout (.25 in.) rachises with small tubercles at the ends of rather long (1.5 to 4 in.) slender peduncles; pedicels slender, .5 to .75 in. long; buds hemispheric, 5-angled, flattened above, .25 in. in diam. *Calyx* small; lobes ovate, ciliate, membranous, glandular, recurved, .03 in. long. *Corolla* .5 to .6 in. in diam. when open, glabrous without, puberulous within; lobes ovate-acuminate, .2 in. long. *Corona* of 5 processes more or less upturned; lower lobes ovate, thick, very obtuse at tip, with a raised ovate ring above and deeply cleft valves below; upper lobe shorter than the anthers, erect, acute. *Staminal-column* short; anther-cells slightly divergent; appendages scarious, acuminate; pollen-masses thick, oblong, straight on inner side, attached by short caudicles embracing their base to the rather large conical pollen-carrier. *Style-apex* 5-lobed, acute at tip. *Follicles* (immature) 1 or 2, very slender, narrow; pericarp very thin, smooth. *Seeds* small, oblong, truncate at tip with a .75 in. long coma.

PENANG: *John Scott*. PERAK: *Scortechini* 464, 1557.

John Scott's specimen has rather thinner leaves, but this is probably only due to youth. His specimen bears no flowers, only young fruit, so we think it best not to couple his name with the species.

9. *HOYA CAUDATA*, Hook. f. Fl. Br. Ind. IV. 60 (1883). A twining epiphytic shrub, rooting on trees; branches .1 to .2 in. thick, with corky rugose bark. *Leaves* thick, fleshy, coriaceous when dry; ovate, acuminate at apex, rounded or cordate at base; both surfaces glabrous, sparsely papillose; margins corrugate and recurved; 3 to 7 in. long, 2 to 3 in. broad; midrib slender; main nerves 3 to 4 pairs, distant, arching, very faint; reticulations not visible; petiole up to .25 in. long, very thick, so thick as to appear globose. *Umbels* many-flowered on a .5 to 1 in. long tuberculate rachis at the end of a thickened 1 in. long peduncle; pedicels .5 in. long, filiform; flowers white suffused with pink. *Calyx* very membranous; lobes linear-lanceolate, glabrous, .05 to .075 in. long. *Corolla* .5 to .75 in. in diam.; lobes ovate, long caudate-acuminate, silvery-pilose within. *Corona* fleshy; lower lobes horizontal, elliptic-ovate, the broadest end outwards, concave above; the upper lobe produced in a long erect subulate spur shorter than the anther-tips. *Staminal-column* short; anther-wings straight; appendages membranous, long caudate-acuminate; pollen-masses flattened, oblong, truncate, attached by cup-shaped broad caudicles to the rather narrowly ovate brown pollen-carrier. *Style-apex* 5-angled, with a short conical tip.

MALACCA: *Maingay* (K.D.) 1128.

10. *HOYA LATIFOLIA*, G. Don Gen. Hist. Dichl. Pl. IV. 127 (1838).



A climbing (probably epiphytic) shrub; branches very stout, smooth, lenticellate, giving out slender rootlets occasionally. *Leaves* very thick, fleshy; ovate or oblong-ovate, acute at apex, rounded or cordate at base often slightly peltate; glabrous on both surfaces, dull when dry; margins strongly recurved, shining; 5 to 10 in. long, 3 to 7 in. broad; midrib with a gland at the base; nerves 3 to 5 from the base, connected at intervals by few irregular cross-nerves; reticulations not otherwise visible; petiole very stout, .25 to .5 in. long, articulated to a thick shining cup-like base at the node. *Umbels* racemose, on thick, pitted, up to 1 in. long, tubercular rachises at the end of stout 1 to 2 in. long peduncles, which are solitary or fascicled in the leaf-axils or at the nodes of very long (sometimes 5 ft.!) flowering branches; pedicels very slender, puberulous, .25 in. long; buds flattened, 5-angular; flowers very small, grey, .35 in. broad when open, .15 with the lobes closed. *Calyx* minute, membranous; lobes ovate, acute, .3 in. long. *Corolla* small, rotate, pubescent within; lobes ovate, at first incurved over the staminal-column, afterwards spreading. *Corona* of 5 membranous processes, each consisting of an ovate lower horizontal or slightly upcurved lobe concave above and deeply grooved below, the tip apiculate recurved, and an upper shorter erect lobe with acute tip and a channel behind. *Staminal-column* very short; anther-cells divergent; appendages membranous, acute; pollen-masses oblong-falcate, pellucid on the outer margin, attached by short thick caudicles to the rather large 3-lobed pollen-carriers. *Style-apex* sharply 5-angled, conical-apiculate. *Follicle* 1, very slender, 4 to 4.5 in. long, .2 in. broad; pericarp thin, puberulous. *Seeds* oblong, acute at base, truncate at tip, .25 in. long, bearing a white silky coma 1 to 1.25 in. long; cotyledons thick, ovate-oblong, .1 in. long; radicle as long and broad as cotyledons, flattened. Dene. in DC. Prodr. VIII. 638; Miq. Fl. Ind. Bat. II. 521; Hook. f. Fl. Br. Ind. IV. 57. *H. macrophylla*, Wight Contrib. 38, *not of Blume*. *H. polystachya*, Blume Mus. Bot. Lugd-Bat. I. 45, t. 9; Miq. l. c. 522.

PENANG: Wallich 8165A. PAHANG: Kota Glarggi woods, Ridley in Trans. Linn. Soc. Ser. 2, III. 321. SINGAPORE: Maingay (K.D.) 1124; Lobb; Hullett 621; at Cluney Road, Goodenough 2734—DISTRIB. Java, Sumatra.

11. HOYA LACUNOSA, Blume Bijdr. 1063 (1825). A creeping epiphytic undershrub, rooting at the nodes; branchlets very slender, glabrous. *Leaves* very thick, fleshy; ovate, ovate-lanceolate or lanceolate, acute or acuminate at apex, rounded or attenuate at base; both surfaces glabrous, shining; margins thickened; .75 to 1.75 in. long, .5 to .75 in. broad; midrib when dry faint, usually glandular at the base; main nerves 2 to

4 pairs, also faint but visible, at right angles to the midrib, straight to join an intramarginal nerve covered by the marginal thickening; petiole thick, very short. *Umbels* axillary, on stout peduncles .75 to 1.5 in. long, which end in a thickened rachis of cushion-like bracts often .25 in. long; pedicels slender, .25 to .35 in. long; buds globose; flowers white, usually tinged with yellow, scented. *Calyx* rotate, membranous; lobes as long as tube, .025 in. long, obtuse; scales minute. *Corolla* .25 in. in diam. when spread out, pubescent or scurfy within; lobes triangular, recurved. *Corona* membranous, of 5 processes, forming a concave-sided cone, the lower lobe of each process spreading or upcurved, ovate, the upper lobe ovate-acute, exceeding the anther. *Staminal-column* short; anthers minute with very thin membranous acute appendages; pollen-masses oblong-falcate, reticulate, compressed, attached by erect thickened cup-shaped caudicles to the small pollen-carriers. *Style-apex* rather deeply lobed; tip conical. *Follicles* smooth. Dene. in DC. Prodr. VIII. 638; Hassk. Cat. Bogor. 126, and Flora Bot. Zeit. (1845) 280; Miq. Fl. Ind. Bat. II. 525; Hook. Bot. Mag. 4826, 5272; Hook. f. Fl. Br. Ind. IV. 55. *Otostemma lacunosum*, Blume Rumph. IV. 30, t. 184, fig. 2 and Mus. Bot. Lugd.-Bat. I. 59, t. 11.

PENANG: *Michado* for *Curtis*. PERAK: *Scortechini* 1558; *King's Collector* 3476. MALACCA: *Maingay* (K.D.) 1133 (*part*). SELANGOR: at Rawang, *Ridley* 7569.—DISTRIB. Sumatra, Java, Borneo.

12. HOYA DIVERSIFOLIA, Blume Bijdr. 1064 (1826). A climbing glabrous shrub; branches flexuous, smooth, brown; branchlets paler; the bark very thin. *Leaves* fleshy, very thick; broadly elliptic or obovate, obtuse or apiculate at apex, rounded at base; both surfaces glabrous, dull; margins recurved; 2 to 4 in. long, 1.5 to 2.5 in. broad; nerves only visible when dry, midrib broad; main nerves about 4 to 6 pairs, rather irregular, at about 60° with the midrib, soon branching; reticulations very indistinct; petiole .25 to .5 in. long, thick. *Umbels* many-flowered, on stout thick .25 to .75 in. long tubercular rachises at the ends of very thick .5 to 2.5 in. long peduncles, which are lateral one to each pair of leaves; pedicels slender, .5 in. long; buds flattened with 5 rounded angles; flowers .25 to .35 in. broad, white or rose-coloured with pink corona (yellowish-white (*Maingay*)). *Calyx* membranous; lobes elliptic-obtuse, usually ciliate at the tips, .075 in. long; scales apparently none. *Corolla* glabrous without, puberulous within; lobes cordate-acuminate. *Corona* of 5 processes attached to the bases both of the staminal-column and of the corolla-tube; lower lobe of each process orbicular or ovate, concave above and with a small central boss, 2-winged below, the wings connivent; upper lobe erect, triangular-acute, shorter than the anther-appendages. *Staminal-column* very short;

anther-cells parallel above, divergent and empty below; appendages scarious, acute or acuminate; pollen-masses oblong, truncate at top, thin on the outer margin, attached by very short thick caudicles to the rather long obconical pollen-carriers. *Style-apex* 5-angled, depressed, with a short conical apiculus. *Follicles* sublinear, falcate, 6 in. long, .75 in. broad; pericarp thick, apparently .25 in. or more. *Seeds* oblong, .25 in. long. Dene. in DC. Prodr. VIII. 636; Miq. Fl. Ind. Bat. II. 518; Hook. f. Fl. Br. Ind. IV. 61. *H. orbiculata*, Wall. in Wight Contrib. 36; Wall. Cat. 8151; Dene. l. c. 635; Miq. l. c. 519. "*Sussuela esculenta*," Rumph. Herb. Amb. V. 467, t. 175, f. z.

PENANG: at Pulau Boetong, *Curtis* 928. PERAK: *Wray* 2718; *Scortechini* 118. MALACCA: *Griffith* 3787; *Maingay* (K.D.) 1130. PAHANG: at Pekan, *Ridley* 1619. SINGAPORE: *Ridley* 1626, 2733—DISTRIB. Burma (at Prome, *Wallich* 8151), Java, Amboyna.

13. HOYA MAINGAYI, Hook. f. in Fl. Br. Ind. IV. 62 (1883). A trailing epiphytic shrub, sending out rootlets along its stem; nodes much swollen; branches stout; branchlets terete, pale brown. *Leaves* very thick, fleshy, coriaceous when dry; elliptic-lanceolate or oblanceolate, shortly acuminate at apex, long acuminately narrowed at base; both surfaces glabrous, dull when dry; margins recurved; 7 to 9 in. long, 2.5 to 3.5 in. broad; midrib slender but prominent when dry, with a gland or enlargement at the base above the petiole; main nerves about 5 pairs, prominent when dry, especially above, at about 60° to 70° with the midrib, nearly straight at first, then branching and forming a rough intramarginal nerve; secondary nerves few; reticulations irregular, distant; petiole thick, .25 to .5 in. long. *Umbels* many-flowered (20 to 30), on a very short tubercular rachis at the end of a thick peduncle .3 to 1 in. long; pedicels very slender, .5 to 1 in. long; buds obconical, pentagonal, concave above, .25 in. broad; flowers pale pink; corona white. *Calyx* small, pale pink with red tips, red-scarious-punctate without, glabrous within; lobes .03 in. long, obtuse, ciliate; no scales. *Corolla* .5 to .75 in. broad when open; lobes triangular, villous within with pale crispate hairs. *Corona* of 5 processes; outer lobe ovate, acute, horizontal, bi-cleft, concave above with central ridge, 2-valved below; upper of a short acute tooth shorter than the anther-tip. *Staminal-column* short, attached at the base of the corolla-tube; anther-cells divergent; appendages scarious, acuminate, incurved; pollen-masses flattened, oblong-falcate, waxy, attached by short caudicles embracing their bases to the conical pollen-carriers. *Style-apex* 5-angled, angles acute, tip conical. *Fruit* not known in the ripe state, when immature 4 to 5 in. long, .25 in. broad, acuminate, tip recurved; pericarp smooth.

PERAK: *Scortechini* 584. MALACCA: *Maingay* (K.D.) 1136.



14. HOYA PARASITICA, Wall. in Wight Contrib. 37 (1834), and Cat. 8159. A stout climbing epiphytic shrub, creeping over the trunks and branches of trees and giving off roots from every part (Roxb.); branches smooth, pale, fleshy. *Leaves* fleshy, thick, very variable; ovate or elliptic or lanceolate, acute or acuminate at apex, rounded or almost cordate to cuneate at base; glabrous on both surfaces; margins recurved; 3 to 7 in. long, 1·5 to 3 in. broad; 5-nerved from the base, the outermost pair thin, forming loops near the margins, from the sinuses of which transverse nerves join them to the middle pair; midrib with several transverse nerves also joining the middle pair, which have one or two loops near the tip, all raised on both surfaces when dry, as are the other irregular reticulations; petiole very thick, ·25 to 1 in. long. *Umbels* many-flowered, racemose, on short or long (reaching 4 in.), thick (often nearly ·25 in. in diam.), tubercular rachises at the ends of stout 1 to 3 in. long axillary or lateral peduncles which are solitary or in pairs; pedicels slender, ·5 in. long or longer; buds turbinate, 5-angled; flowers pearly-white with a pink centre, very fragrant. *Calyx* membranous; lobes ovate, acute; scales very small. *Corolla* ·3 in. broad; lobes cordate, glabrous, inflexed, with the corona-processes projecting between them. *Corona* of 5 membranous 2-lobed processes, which are horny and shining when dry, and white with pink tips; the lower lobes ovate, spreading, grooved beneath; the upper lobes erect, acute. *Staminal-column* short; anther-cells divergent; appendages membranous, acute; pollen-masses oblong, truncate, thin on the outer margin, attached by short thick caudicles to the conical pollen-carriers. *Style-apex* membranous, 5-angled, conical-apiculate. *Fruit* not known. Wight Ic. 587; Dene. in DC. Prodr. VIII. 637; Hook. f. Fl. Br. Ind. IV. 57; Prain Beng. Plants 700. *H. Hookeriana*, Wight Contrib. 37; Wall. Cat. 8153; Dene. l. c. 636. *Hoya* sp., Wall Cat. 8153. *H. pallida*, Lindl. in Bot. Reg. t. 951; Paxt. Fl. Gard. t. 26, copied in Lemaire Jard. Fleur. t. 64. *Asclepias parasitica*, Roxb. Hort. Beng. 20, and Fl. Ind. II. 42; Wight Ic. t. 587.

KEDAH: *Kunstler* 1829. PENANG: at Waterfall, *Curtis*. PERAK: at Sungie Larút, *Wray* 2273; at Bake Kuran, *Scortechini* 1626; at Ulu Bubong, *King's Collector* 10316. MALACCA: *Griffith*; *Maingay* (K.D.) 1126, 1132, 1138. PAHANG: *Praman*, near Pekan, *Ridley* in Trans. Linn. Soc. Ser. 2, III. 321. SINGAPORE: *Ridley* 1796, 8070.—DISTRIB. India (Sikkim, Assam, Sundarbans, Chittagong, Andaman Islands).

*Kunstler* describes the colour of the flowers as "white with a pink centre" or "waxy white with a purplish tinge," but *Wray* says it is "pale greenish-yellow with a few small spots of crimson." *Roxburgh*, who had it in cultivation, says the



flowers are "pearl-coloured," and this is what the Fl. Br. Ind. says of the corolla, giving the corona-processes as "white with pink at the junctures." Maingay (MS. Notes IV. p. 41) says, "petals white, faintly greenish towards the tips, corona white." These remarks, for what seems clearly to be the same plant, explain the difference between Lindley's and Paxton's drawings alluded to in the Fl. Br. Ind. As remarked in Fl. Br. Ind., *H. cinnamomifolia*, Hook. Bot. Mag. 4347, from Java, "has very similar flowers and leaves." But for the corolla being green and the corona purple in that fig., we should be inclined to place it under *H. parasitica*.

15. *HOYA CORIACEA*, Blume Bijdr. 1063 (1826), and Rumph. IV. t. 187. A climbing shrub, nearly glabrous; branches shining, smooth, angled when dry; branchlets pubescent. *Leaves* coriaceous (Blume) or fleshy (Wight), chartaceous when dry; ovate or ovate-lanceolate, acute or acuminate at apex, rounded at base; glabrous and more or less shining on both surfaces; margins slightly recurved; 3 to 6 in. long, 1 to 2.5 in. broad; midrib slender, raised on the lower surface, sometimes with one or more glands just above the petiole; main nerves distinct, 4 to 6 pairs, at about 40° to 50° with the midrib, straight and then branching and anastomosing with a looped intramarginal nerve; reticulations netted, prominent; petiole slender in young leaves, thick in old ones, .25 to .75 in. long. *Umbels* racemose, many-flowered (30 to 40), on stout tubercular rachises .25 to .75 in. long and .15 to .2 in. thick at the ends of stout lateral puberulous peduncles 2 to 5 in. long; pedicels slender, .75 to 1.25 in. long; buds flattened, 5-angled, .5 in. broad, .15 in. high; flowers straw-coloured, yellow or reddish, the corona white. *Calyx* pubescent without; tube short; lobes linear, sparsely ciliate, .15 in. long; scales minute. *Corolla* .75 in. in diam. when expanded; lobes triangular-ovate, acuminate, villous within and grey when dry ("hairs like collapsed hollow tubes"—Wight), at first incurved over the column, at last recurved. *Corona* of 5 spreading processes, shining and horny when dry; lower lobes ovoid, acute, inflated, 2-winged below with the wings connivent; upper lobes erect, acute, connivent with but shorter than the anthers. *Staminal-column* short; anther-cells parallel above with divergent empty ones below; appendages scarious, ovate-acute; pollen-masses slender, oblong-falcate, straight and thickened on the inner edge, attached by spatulate caudicles with a raised margin above to the very narrow slender pollen-carriers. *Style-apex* 5-angled, rather thick, depressed above with a small umbo. *Follicle* 1, 4.5 to 5 in. long, .5 to .75 in. broad, lanceolate, obtusely beaked; pericarp very thick, woody, rugose. *Seeds* oblan-ceolate, thick, .25 in. long, truncate at tip and bearing a silky coma 1.25 in. long; cotyledons elliptic, fleshy, .15 in. long; radicle cylindric, .075 in. long. Mus.Bot.Lugd.-Bat. I. 44; Miq. Fl. Ind. Bat. II. 521; Dene. in DC. Prodr. VIII. 638; Bot. Mag. t. 4518, copied in Fl. des

Serres t. 578; Paxt. Fl. Gard. I. 77, fig. 55; Lemaire Jard. Fleur. t 37 Hook. f. Fl. Br. Ind. VI. 61; Schum. in Engl. & Prantl Pflanzenfam. IV. 2, 290, fig. 88 A, B. *H. Brunoniana*, Wight Contrib. 37; Wall. Cat. 8163; Dcne. l. c. 636.

PERAK: *Scortechini* 533. MALACCA: *Griffith*; *Maingay* (K.D.) 1131, 1134. PAHANG: at Pekan, *Ridley* 2171. — **DISTRIB.** Java, Borneo (*Motley* 1121; *Beccari* 3926).

16. HOYA FORBESII, King & Gamble, n. sp. A climbing shrub, rooting on trees and probably epiphytic; branchlets somewhat angular, lenticellate, with pale brown shining bark. *Leaves* coriaceous when dry; elliptic-oblong or -obovate, shortly and bluntly acuminate at apex, rounded at base; upper surface glabrous, shining; lower surface minutely papillose; both pale brown when dry; margins somewhat recurved; 4 to 7 in. long, 2·5 to 4 in. broad; midrib strong, much raised beneath, bearing on the upper surface a gland just above the petiole; main nerves about 7 pairs, irregular but usually at 40° with the midrib, more or less curved and branching; secondary nerves frequent, especially near the top between the main nerves; reticulations transverse, irregular, clearly visible only on the upper surface; petiole very thick, bent, articulate in the middle, about ·5 in. long. *Umbels* apparently few-flowered, on ·75 in. long rachises with small tubercles at the end of short (about ·75 in.) peduncles; pedicels filiform, ·5 in. long, puberulous; buds flattened, ·25 in. in diam.; flowers having greyish-white corollas with purple tips (*Forbes*). *Calyx* membranous; lobes about twice as long as tube, ovate, ciliate, puberulous without; no scales. *Corolla* ·4 in. in diam., puberulous without; lobes broadly triangular-ovate-acute, incurved. *Corona* of 5 inflated processes closely adnate to the staminal-column; lower lobes horizontal, narrow-oblong, slightly ridged above, 2-valved below, nearly ·1 in. long; upper lobe a minute erect tooth. *Staminal-column* short; anthers incumbent over the style-apex; cells divergent; appendages acute, scarious; pollen-masses flattened, falcate, attached by short straight caudicles to the narrow pollen-carriers. *Style-apex* very thin, deeply 5-lobed with a conical tip. *Fruit* not known.

PERAK: *Scortechini* 1679, 1680. — **DISTRIB.** Sumatra, on Kaba Volcano, 5000 feet (*Forbes* 2896A).

17. HOYA FINLAYSONII, Wight Contrib. 38 (1834). A climbing shrub; stem stout; branchlets pale brown, smooth, lenticellate, flexuose. *Leaves* coriaceous, thick, hard and tough when dry; ovate- or oblong-lanceolate, obtusely acuminate at apex, more or less rounded at base; both surfaces at first minutely papillose, afterwards glabrescent or dotted, when fresh greenish-red above, dark red beneath; margins with

a wavy nerve close to the edge; 5 to 7 in. long, 1.5 to 2.5 in. broad; nerves very prominent and raised on both surfaces when dry; midrib stout, with a large gland just above the petiole; main nerves about 5 to 7 pairs besides the marginal one, at about 60° with the midrib, nearly straight to join a second and prominent looped intramarginal nerve; secondary nerves many, irregular; reticulations irregular, netted; petiole very thick, .25 to .5 in. long. *Umbels* very many-flowered, without any prominent tubercular rachis; peduncles .75 to 2 in. long, rather slender; pedicels almost capillary, .5 to .75 in. long; buds 5-angled, hemispheric below, flattened and depressed above, .25 in. across; flowers with cream-coloured and pink corolla and waxy-white corona. *Calyx* thin, nearly hyaline, with a few brown veins; lobes obtuse, .05 in. long, pubescent within. *Corolla* .4 in. broad when open, pubescent within; lobes triangular-ovate-acute, usually inflexed. *Corona* of 5 spreading inflated processes; the lower lobes ovate-acute, concave at first, afterwards more or less ridged, 2-winged below; the upper lobe erect, short, acute. *Staminal-column* short, attached to the top of the corolla-tube; anther-cells divergent; appendages short, rounded, scarious; pollen-masses oblong-falcate, obtuse at tip, attached by very short thick caudicles to the conical pollen-carriers. *Style-apex* 5-angled, with 5 rays leading to a short apiculus. *Follicle* 1, very slender, 7.5 in. long, .25 in. broad, straight, acuminate; pericarp thin, glabrous, striate. *Seeds* cylindric, .3 in. long, acute at base, truncate at tip, and bearing a 1 to 1.5 in. long silky coma; testa very thin, brown; cotyledons fleshy, lanceolate, .15 in. long; radicle cylindric, .1 in. long. Wall. Cat. 8166; Dene. in DC. Prodr. VIII. 638; Miq. Fl. Ind. Bat. II. 527; Hook. f. Fl. Br. Ind. IV. 62.

PERAK: *Wray* 2724; *King's Collector* 4800. SINGAPORE: *Wallich* 8166.—DISTRIB. Siam? (*Finlayson*).

The specimens in the Kew Herbarium, have no flowers, but we see no reason to doubt the identification of the leaves of our specimen.

18. *HOYA RIDLEYI*, King & Gamble, n. sp. A twining epiphytic undershrub, rooting at intervals on the bark of trees; branchlets pale, terete, lenticellate, rather slender when dry. *Leaves* fleshy, coriaceous when dry, variable; ovate or ovate-oblong or oblong-lanceolate, acute at apex, rounded or narrowed or sometimes cuneate at base; both surfaces glabrous; margins recurved; 3 to 5 in. long, 1.25 to 1.75 in. broad; midrib slender, faint, as are the nerves generally, even when dry; main nerves about 5 to 6 pairs, the lowest pair starting from the base and curving along the margin, the others nearly at right angles, quickly branching and joining the marginal one; reticulations irregularly



netted; petiole very thick, .25 to .75 in. long, broad at the junction with the blade. *Umbels* many-flowered, on .25 to 1 in. long rachises with small tubercles at the ends of stout lateral peduncles 1 to 4 in. long; pedicels slender, .5 to .75 in. long; buds flattened, .25 in. in diam. *Calyx* papillose without; lobes oblong, acute, .06 in. long; no scales. *Corolla* rugose without, puberulous within; lobes cordate, almost 3-pointed, points acuminate, especially the end one. *Corona* of 5 shining inflated processes; lower lobe horizontal, ovate, sharply acute, concave on the upper surface with a median ridge, 2-valved below; upper lobe on acute erect tooth, shorter than the anthers. *Staminal-column* short, inserted on the tube of the corolla, wings of filaments ear-like; anther-cells divaricate; appendages scarious, acuminate, incurved; pollen-masses flattened, oblong, truncate at top; attached by short thick caudicles to the 3-lobed rounded rather large pollen-carriers. *Style-apex* membranous, 5-angled; tip long conical. *Fruit* not known.

KEDAH: at Pulau Songsong, *Curtis*. PENANG: *Curtis*; at Pulau Tikus, *Ridley* 9476. PERAK: at Maxwell's Hill, *Ridley* 5519. SINGAPORE: at Grange Road, *Ridley* 10358.

To this species, also, probably belongs *Curtis* 2355 from Kwala Lumpor, Selangor, which has, however, smaller leaves, but no flowers.

19. HOYA PARVIFLORA, Wight Contrib. 37 (1834). A twining, slender, epiphytic undershrub; rooting on the stems and branches of trees; branchlets very slender, terete. *Leaves* thick, coriaceous; lanceolate, acute both at apex and base; glabrous on both surfaces; margins slightly recurved; 2 to 4 in. long, .35 to .75 in. broad; midrib slender, obscure; main nerves very faint even when dry, 5 to 6 pairs, very acutely (about 10°) spreading from the midrib, the lowest pair even more so; reticulations not visible; petiole about .15 in. long, thick. *Umbels* many-flowered (30 to 40), racemose, lateral or terminal; peduncle rather stout, 1.5 to 1.75 in. long, ending in a thickened strobilate rachis often 1 in. long with minute imbricate bracts; pedicels slender, .25 to .5 in. long; buds globose, depressed; flowers many, about .15 to .25 in. in diam., apparently white. *Calyx* membranous, very small; lobes ovate. *Corolla* rotate, revolute, villous within with unicellular soft hairs; lobes triangular. *Corona* of 5 membranous horizontally spreading processes, forming a shallow cone; lobes longitudinally folded, bifid at apex. *Staminal-column* very short; anthers connivent over the style-apex, with very thin membranous appendages; pollen-masses very minute, flattened, oblong-truncate, attached by minute cup-shaped caudicles to the triangular pollen-carriers. *Style-apex* with a conical tip. *Follicles* very slender, 4 to 5.5 in. long, .2 in. broad; pericarp thin,



smooth. *Seeds* oblong, .25 in. long, not winged, truncate at tip, and bearing a 1 in. long white silky coma; testa very thin, pale brown, smooth; cotyledons oblong, .05 in. long; radicle cylindric, .075 in. long. Wall. Cat. 8156 A; Dene. in DC. Prodr. VIII. 637; Hook. f. Fl. Br. Ind. IV. 54.

PENANG: at Balik Pulau, *Curtis* 689; on Mount Elvira, *Md. Haniff* for *Curtis*.—DISTRIB. Tenasserim (*Wallich* 8156 A).

20. HOYA REVOLUTA, Wight MS.; Hook. f. in Fl. Br. Ind. IV. 55 (1883). A twining epiphytic undershrub, occasionally rooting from the nodes; branchlets slender, terete, glabrous. *Leaves* very thick and fleshy; ovate or ovate-lanceolate, acuminate at apex, rather abruptly acute and attenuate at base; both surfaces glabrous, very pale when dry and more or less shining; margins strongly recurved; 1.5 to 3 in. long, .75 to 1 in. broad; midrib and main nerves (3 to 4 pairs at about 60°) only occasionally, and then very faintly, visible when dry; petiole very thick, .1 to .15 in. long. *Umbels* on a 2 to 4 in. long peduncle, ending in a thick strobilate rachis .5 in. long with cushion-like minute bracts; pedicels of various lengths, .25 to 1 in. long, filiform; buds small, round, depressed, .1 in. in diam.; flowers small, pink, or white with pink tips. *Calyx* rotate; lobes oblong, obtuse, .02 in. long; scales small, flat. *Corolla* .125 in. in diam., with a slight raised fold at the mouth of the tube; lobes triangular, as long as tube. *Corona* of 5 membranous processes united into a conical vertically 5-lobed column, each again lobed and produced upwards in an acute point. *Staminal-column* very shortly stalked; anthers inflexed; appendages acuminate, membranous; pollen-masses oblong, obtuse, attached by short thick caudicles to the small pollen-carriers. *Style-apex* deeply 5-lobed, with a conical apiculus. *Fruit* not known. *H. ovalifolia*, Wall. Cat. 8160B.

PERAK: in Larut 3962 and at Relan Tujor, *Wray* 1902; *Scortechini*. MALACCA: *Griffith*; *Maingay* (K.D.) 1127, 1129, 1123 (*part*). SINGAPORE: *Wallich* 8160B.

*Wray* No. 3962, from Blanda, Mabok Plains, Larut, is a fruiting specimen which may possibly belong to *H. revoluta*, Wight; but the leaves are lanceolate and not ovate, and the flowers are described as yellow instead of pink. The following is the description:—

A climbing undershrub; branches terete, pale brown. *Leaves* fleshy, coriaceous when dry; lanceolate, acuminate at apex, narrowed at base; glabrous on both surfaces; margins strongly recurved; 1.5 to 2 in. long, .5 to .75 in. broad; midrib and main nerves only very faintly visible when dry, the latter curving upwards at an acute angle; petiole very thick, .25 in. long on a much enlarged base. *Flowers* not seen. *Follicle* lanceolate, poniard-shaped, acutely angled, 2.5 in. long, .4 in. broad; pericarp thick. *Seeds* very small, .1 in. long, trigonous-oblong with a broad truncate apex, bearing a white silky coma 1 to 1.5 in. long; testa thin, brown; albumen rather thick;

cotyledons elliptic, .02 in. long; radicle .01 in. long, flattened perpendicularly to the cotyledons.

21. *HOYA PLICATA*, King & Gamble, n. sp. A climbing, probably epiphytic, undershrub; branchlets rather stout, terete, yellowish. *Leaves* fleshy, coriaceous when dry; ovate-lanceolate, acuminate at apex, acute at base; smooth and glabrous on both surfaces; margins slightly recurved; 3 in. long, 1 in. broad; midrib very faint and then only when dry; remaining nerves invisible; petiole stout, .25 in. long, flattened. *Umbels* many-flowered, racemose, on stout tubercular rachises, .25 to .5 in. long at the ends of stout .75 to 1 in. long peduncles; pedicels fleshy, broadly flattened when dry, 1 in. long; buds 5-angled, flattened. *Calyx* small; lobes ovate, acuminate, hyaline; scales subulate. *Corolla* .4 in. broad, with a raised 5-angled villous ridge in the tube above the insertion of the staminal-column, puberulous on both surfaces; lobes triangular, .1 to .15 in. long. *Corona* of 5 shining horny processes attached to the backs of the anthers; lower lobe ovate, obtuse or bifid at apex, with a broad fold on the upper surface; upper lobe erect, acuminate, as long as the anthers. *Staminal-column* short; anther-cells parallel; appendages scarious, acuminate; pollen-masses flattened, granular, thin on the margin, truncate at top, seated on the face of spathulate horizontal caudicles, which connect them with the rather large-lobed pollen-carriers. *Style-apex* 5-angled, fleshy, with a short conical apiculus. *Fruit* not known.

PERAK: at Maxwell's Hill, 3000 ft., *Scortechini* 323.

22. *HOYA CAMPANULATA*, Blume Bijdr. 1064 (1825). A small twining shrub; branches fleshy; branchlets pale brown and shining when dry, the bark scaling off. *Leaves* fleshy and bright-green when fresh, coriaceous when dry; elliptic-oblong, acuminate at apex, cuneate or attenuate, sometimes rounded at base; both surfaces glabrous, more or less shining, pale when dry; margins recurved; 2.5 to 6.5 in. long, 1 to 2.5 in. broad; midrib stout, raised below, impressed above when dry; with a rounded gland at the base above the petiole; main nerves 6 to 7 pairs, straight to meet, often at scarcely more than half-way to the edge, a prominent (when dry) looped intramarginal nerve; secondary nerves few, similar; reticulations many, irregular, prominent, and raised above when dry; petiole .25 in. long, stout. *Umbels* about 16- to 20-flowered; peduncles stout, 1 to 2 in. long, the bracteate portion .25 to .5 in. long; pedicels very slender, 1 to 1.25 in. long; buds globose, depressed; flowers cream-coloured. *Calyx*-lobes membranous, hyaline, subulate. *Corolla* glabrous, about 1 to 1.5 in. broad or broader; lobes ciliate, boat-shaped, .6 in. long; scales very short, apiculate. *Corona* of 5 processes; lower lobes of spreading spurs .15 to .2 in. long,

smooth, shining, horny when dry; upper lobes somewhat similar, erect. *Follicles* straight, cylindric, .6 to .8 in. long, .2 in. broad; pericarp smooth, green with white stripes when fresh. *Seeds* oblong, obspathulate, .3 in. long, .1 in. broad, with a short wing at the base, the tip truncate with a white silky coma 1 to 1.5 in. long; testa very thin, smooth; cotyledons oblong, .15 in. long; radicle cylindric, .1 in. long. Wall. Cat. 8171; Dene. in DC. Prodr. VIII. 633; Miq. Fl. Ind. Bat. II. 513; Hook. f. Fl. Br. Ind. IV. 62. *H. campanulata*, Blume Bijdr. 1064; Lindl. Bot. Reg. (1847) t. 54; Hook. Bot. Mag. t. 4545. *Cystidianthus campanulatus*, Hassk. Cat. Hort. Bog. 126; Blume Mus. Bot. Lugd.-Bat. I. 57; Miq. l. c. 515. *Physostelma Wallichii*, Wight Contrib. 40; Wall. Cat. 8171; Dene. in DC. l. c.; Miq. l. c. 513; Hook. f. Fl. Br. Ind. IV. 62. *P. ? campanulata*, Dene. l. c.

PERAK: at Relan Tujur, Wray 1841, 3139, 4014, 4024; *Scortechini* 171, 336; at Bujong Malacca, *Ridley* 9712; *King's Collector* 2587, 3457, 3819. SINGAPORE: *Wallich* 8171.—DISTRIB. Sumatra, Java (*Forbes* 416), Borneo (*Haviland* 1971).

A specimen of Forbes's from Sumatra has flowers quite twice as large as those from the Peninsula, but the structure is the same. He says, "Flowers cream-white with a flush of rose-purple, very fragrant." The description of the follicles is taken from those sent by Wray with his No. 1841, but as they are not attached to the plant, and we have seen no others for comparison, we do not feel quite sure of their identification.

23. HOYA WRAYI, King & Gamble, n. sp. A slender creeping epiphytic undershrub, rooting on the branches of trees; stems slender, very rough when dry. *Leaves* fleshy, thinly coriaceous when dry; lanceolate, obtuse and glandular-apiculate at apex, long-attenuate at base; upper surface glabrous smooth, lower minutely papillose, both greyish when dry; margins recurved; 3.5 to 4 in. long, 1 to 1.25 in. broad; midrib slender, broadened at base; main nerves very inconspicuous even when dry, about 4 pairs, at about 30° with the midrib; reticulations not visible; petiole very thick, rugose, jointed at the junction with the blade. *Inflorescence* not seen; rachis minutely tuberculate; pedicels slender, .75 to 1 in. long, scurfy. *Calyx* hyaline, papillose without; tube short; lobes linear-oblong, .05 in. long; scales subulate. *Corolla* campanulate-rotate, .3 in. broad when open, villous within with cellular hairs, margins fimbriate-crispate; lobes very short, triangular. *Corona* of 5 processes, attached above the filament-tube, horny and yellow when dry; lower lobe a slightly upcurved linear-lanceolate ridged spur; upper similar, erect, dorsally flattened, longer

than the anthers. *Staminal-column* with filament-tube free from the corona, otherwise short; anthers short, cells parallel; appendages scarious, ovate, curved over the style-apex; pollen-masses flattened, oblong, obliquely truncate with membranous margins, attached by broadly inflated cup-like caudicles to the conical pollen-carriers. *Style-apex* 5-angled, thick, concave above with a conical apiculus. *Fruit* not seen.

PERAK: at Gunong Batu Pateh, 4300 ft., Wray 371.

## 28. DISCHIDIA, Br.

Herbs or undershrubs, usually epiphytic, climbing and rooting on trees or pendulous from them, sometimes almost leafless. *Leaves* usually opposite, fleshy, sometimes converted into pitchers (*ascidia*), sometimes convex and sessile, rugose or bullate. *Flowers* very small, often minute, white yellow or red, in axillary racemose or umbellate cymes or fascicles; the rachis short, thick, tuberculate; peduncles stout. *Calyx* small, 5-partite, membranous, with 5 glandular scales. *Corolla* campanulate tubular or urceolate; the tube ovoid or globose or cylindric; the mouth usually contracted; lobes 5, thick, valvate. *Corolla* staminal, of 5 membranous processes, adnate to the back of the staminal-column, erect, the tips entire, notched or bifid or with incurved or recurved arms; sometimes none or replaced by a corolline corona (Subg. I. CONCHOPHYLLUM). *Staminal-column* very short; filaments connate in a tube; anthers erect, with membranous appendages; pollen-masses 1 in each cell, compressed, waxy, attached by long curved caudicles, usually of cornucopia shape, to the hard oblong pollen-carriers, caudicles in *D. coccinea* very short. *Ovary* of 2 carpels; styles short; style-apex flat or with a conical sometimes capitate tip. *Fruit* of 2 or 1 small slender or thick acuminate follicles; pericarp smooth. *Seeds* very small, flask-shaped, tipped with a long silky coma. —DISTRIB. About 50 species: in tropical India, the Malay Peninsula and Archipelago, the Philippine Islands, New Guinea and Australia.

Staminal-corona absent (Subgenus I. CONCHOPHYLLUM):—

Corolla with a corona like a toothed hanging fold; leaves of two kinds—(1) orbicular, flattened; (2) reniform, markedly convex and bullate, under .75 in. long and 1 in. broad ..

1. *D. astephana*.

Corolla with a corona like a thickened undulate fold; leaves of one kind (so far as known), reniform, slightly convex and bullate, usually over 1 in. long and 1.5 in. broad ..

2. *D. depressa*.

Staminal-corona present, membranous, erect, with incurved or recurved arms (Subgenus II. EUDISCHIDIA):—



Leaves sessile, usually reniform, convex above, closely applied to the tree-trunks or branches (Sect. 1. COLLYRIS):—

Leaves not bullate; flowers white, tipped with lilac .. 3. *D. Collyris*.

Leaves strongly bullate; flowers scarlet, tipped with lilac .. 4. *D. coccinea*.

Leaves partly or wholly converted into pitchers (ascidia) (Sect. 2. ASCIDIFERA):—

Ordinary leaves orbiculate, up to 1 in. in diam., pitchers 2 to 5 in. long, oblong, curved, more or less smooth .. 5. *D. Rafflesiana*.

All leaves (so far as known) converted into subreniform compressed rugose pitchers about 2 in. in diam. .. 6. *D. complex*.

Leaves normal, not (so far as known) converted into pitchers or convex and sessile (Sect. 3. NORMALIA):—

Corona-processes bifid, emarginate or depressed above; lobes incurved:—

Lobes of corona-processes narrow:—

Lobes of corona-processes horizontal or upcurved; leaves thick, fleshy, linear-oblong or spatulate .. 7. *D. benghalensis*.

Lobes of corona-processes curved downwards, spatulate; leaves flat, orbicular, papillose beneath .. 8. *D. Nummularia*.

Lobes of corona-processes broad:—

Leaves ovate, glabrous, not lacunose; corolla-tube merely villous at the throat within .. 9. *D. albida*.

Leaves ovate, often hirsute, lacunose; corolla-tube villous at the throat within and with a ring of hairs half-way down also .. 10. *D. hirsuta*.

Corona-processes rounded or semilunar above; lobes incurved, usually somewhat twisted:—

Corolla-tube under .1 in. long; lobes short, glabrous or villous within:—

Corolla urceolate; tube globose; lobes villous within; leaves lanceolate or ovate-lanceolate, 2.5 to 4 in. long, .75 to 1.25 in. broad; corona-processes extremely thin .. 11. *D. acutifolia*.

Corolla campanulate; lobes glabrous within:—

Leaves ovate, 1.5 to 2.5 in. long, 1 to 1.75 in. broad; petiole flattened .. 12. *D. cordifolia*.

Leaves ovate-lanceolate, 1.5 to 3.5 in. long, .75 to 1 in. broad; petiole not flattened .. 13. *D. monticola*.

Corolla-tube over .1 in. long; lobes elongate, villous within:—

Corolla urceolate, gradually contracted at the throat; tube .125 in. long; leaves ovate-lanceolate, 2 to 2.5 in. long .. 14. *D. Scortechinii*.

Corolla tubular, .3 to .4 in. long, contracted, and again slightly swollen; leaves ovate or ovate-lanceolate, .75 to 1.25 in. long .. 15. *D. tubuliflora*.

#### SPECIES OF WHICH LEAVES ONLY KNOWN.

Leaves elliptic or elliptic-ovate, 1.5 to 3 in. long, .75 to 1 in. broad .. 16. *D. Deschampsii*.

1. *DISCHIDIA ASTEPHANA*, Scortechini MS. in Herb. Calc. A slender creeping epiphytic herb, closely appressed to and rooting on the trunks and branches of trees; stems minutely scabrous-papillose and hirsute. *Leaves* fleshy, sessile, appressed to the stem, dark red beneath, of two kinds—(1) orbicular-villous, papillose, .25 to .35 in. in diam.; midrib slender; main nerves about 2 pairs, very obscure; and (2) reniform, very obtuse, upper surface convex, bullate, lower concave with broad pits, papillose with minute annular papillæ, strigosely hirsute; .5 to .75 in. long, .75 to 1 in. broad; nerves visible on the under surface only, irregular, branching, central one (midrib?) thick. *Umbels* few-flowered, on a thick tubercular rachis .25 in. long at the end of a thick peduncle somewhat shorter; pedicels .1 in. long, angled; buds 5-angled, conical, .15 in. long; flowers white. *Calyx* membranous; lobes oblong-obtuse, ciliate, hirsute beneath, .05 in. long; scales minute. *Corolla* urceolate; tube 5-angled, .125 in. long, contracted at the mouth, furnished within with a ring of stiff hairs below the mouth, and about half-way down a corolline corona consisting of a reflexed membranous hanging annular fold with 5 bilobed teeth, otherwise glabrous; lobes ovate, .025 in. long, erect, pubescent within. *Staminal-corona* none. *Staminal-column* conical, attached to the base of the corolla-tube; filament-ring short; anther-wings horny, large, 2-folded, spreading outwards; anthers erect, cells parallel; appendages very thin, acuminate, connivent; pollen-masses oblong or clavate, truncate, granular, seated on rather long caudicles with cup-like apex, which connect them with the large oblong shining pollen-carriers. *Style-apex* long, conical. *Follicle* 1, lanceolate, 1.25 to 1.75 in. long, acuminate; pericarp very thin, opening out flat and 2-keeled; placenta membranous. *Seeds* not seen.

PERAK: at Bujong Malacca, *Scortechini* 1897. SELANGOR: at Bukit Hitam, *Ridley* 6570 (*in part*).

This very interesting species is closely allied to *Conchophyllum imbricatum*, Bl., the "Pustula arborum" of Rumph. Herb. Amb. V. 473, t. 175, fig. 3. Beccari, in *Malesia*, II. 258, maintains Blume's genus *Conchophyllum*, characterized by the absence of a staminal corona. As, however, in all other respects the species seems to us to bear the characters of *Dischidia*, we have preferred to retain it in that genus, as was done by *Scortechini*, whose manuscript description in the Calcutta Herbarium has been followed closely.

2. *DISCHIDIA DEPRESSA*, C. B. Clarke, MS. in Herb. Kew. A slender creeping epiphyte, closely appressed to and rooting on the stems and branches of trees; stems very slender, wiry; rootlets extremely numerous. *Leaves* fleshy, sessile, orbicular-reniform, flattened or somewhat convex and slightly bullate on the upper surface, glabrous or

very slightly papillose on the lower surface, and with small pits; 1 to 1.25 in. long, 1.5 to 1.75 in. broad; midrib stout; main nerves 2 to 3 pairs, the lowest pair from the base spreading horizontally; the others slightly acutely and early branching. *Inflorescence* not seen. *Calyx* very thin, hyaline; lobes glabrous, rounded, .03 in. long, obscurely 3-nerved. *Corolla* urceolate, much depressed; tube when at full length .075 in. long, glabrous within and furnished in the middle with a 5-lobed undulate fold or corolline corona; the throat closed, with stiff inflexed decumbent shining white hairs; lobes triangular, .05 in. long, thickened, villous within. *Staminal-corona* none. *Staminal-column* short, pyramidal; anther-wings spreading outwards, horny; appendages very thin, obtuse, connivent; pollen-masses cylindro-clavate, attached by cornucopia-shaped caudicles as long as themselves to the ellipsoid pollen-carriers. *Style-apex* conical; tip capitate. *Fruit* not known.

MALACCA: Maingay (K.D.) 1115.

3. DISCHIDIA COLLYRIS, Wall. Cat. 4207 (1829). A creeping epiphyte, trailing over and rooting on the stems and branches of trees; stems slender, terete; rootlets very numerous and spreading. *Leaves* fleshy, coriaceous when dry, sessile; orbicular, convex above with reflexed margins, mucronate or not at apex, slightly cordate at base in young leaves; wrinkled above, papillose and often farinose beneath; 1 to 1.5 in. in diam.; midrib and nerves distinct on the lower surface; midrib stout; main nerves 2 to 3 pairs, nearly at right angles to the midrib, soon branching and spreading; reticulations very few visible. *Umbels* on stout tuberculate rachises in pairs at the ends of short stout clavate peduncles; pedicels very short, slender; flowers white, tipped with pale lilac. *Calyx* membranous, hyaline; lobes ovate, ciliate, .025 in. long. *Corolla* urceolate; tube globose, about .05 in. long, glabrous on both surfaces, the mouth much contracted, forming a ridge within; lobes triangular, thickened, glabrous, erect. *Corona*-processes 5, very thinly membranous and hyaline, linear, with a spreading emarginate top with incurved broad flattened lobes. *Staminal-column* short, conical; appendages erect, acute; pollen-masses oblong, obtuse, seated on cornucopia-shaped flattened caudicles as long as themselves and joined by them to the oblong hard brown pollen-carriers. *Style-apex* pyramidal; tip somewhat capitate. *Follicles* (1 or 2 ?) linear-lanceolate, curved; tip recurved, 2 to 2.5 in. long, .25 in. broad; base slightly gibbous; pericarp thin, pale brown. *Seeds* cylindrical, .15 in. long by .025 in. broad; base winged and slightly bifid; testa very thin, brown; albumen rather copious; cotyledons ovate, fleshy, .05 in. long; radicle cylindric, thick, .075 in. long. Hook. f. Fl. Br. Ind. IV. 51. *D. albiflora*, Griff. Notul. IV. 47, and Ic. Pl. As. t. 410A, fig. 8; Beccari Malesia II. 263. *Collyris*

major, Vahl in Trans. Nat. Hist. Soc. Copenh. VI. 110; Wight Contrib. 66 (*in part*).

MALACCA: *Maingay* (K.D.) 1114 (perhaps also, but doubtfully, K.D. 1116, with rather large flatter leaves and frequent pustules); *Griffith* 3779. SINGAPORE: *Walker*.—DISTRIB. Burma (*Wallich* 4207), Java.

We do not feel (any more than, apparently, did the author of the Fl. Br. Ind.) quite sure of the identification of Griffith's specimens with those herein described (*Maingay* 1114), but believe that they correctly belong to this plant, representing terminal small-leaved sprays. *Conchophyllum imbricatum*, Bl. Bijdr. 1061, cannot be this species, as it is described as having no staminal corona-processes.

4. DISCHIDIA COCCINEA, Griff. Notul. IV. 45 (1854), and Ic. Pl. Asiat. CCCIX. A small creeping epiphyte, trailing over and rooting on the stems and branches of trees; stems slender, smooth or papillose or with rounded warts; rootlets very numerous and spreading. *Leaves* fleshy, coriaceous when dry, sessile; orbicular, convex above, the margins broadly recurved, wrinkled above and with prominent large bullate protuberances, pitted below by the protuberances and minutely papillose, white when young, red when old; .5 to 1 in. in diam.; midrib and 1 to 2 pairs of branching nerves prominent beneath. *Umbels* about 5- to 6-flowered, on short enlarged rachises at the ends of thick peduncles about .1 in. long; the peduncles in pairs in the axils of the leaf-pairs; pedicels slender, clavate, .15 to .2 in. long; buds broadly conical; flowers scarlet with lilac tips. *Calyx* membranous, hyaline; lobes very small, obtuse, glabrous. *Corolla* urceolate; tube gradually attenuate upwards from an inflated base, .1 in. long, slightly puberulous without, glabrous within, with an undulately 5-lobed ridge at a little above half height; lobes triangular-ovate, thickened, .03 in. long, glabrous. *Corona*-processes 5, membranous, linear, with an emarginate top bearing broad incurved lobes. *Staminal-column* slender; the anther-wings minutely horned; appendages ovate-acute, connivent over the style-apex; pollen-masses oblong, slender, attached by minute cup-shaped caudicles to the ovoid dark brown pollen-carriers. *Style-apex* 5-angled, conical with a subulate capitate tip. *Follicles* (usually 2) about 1 in. long, curved and much recurved, rather broad; pericarp crustaceous, smooth. *Seeds* obovoid, .05 in. long, the base minutely winged, the wing dentate; testa thin, pale brown; albumen scanty; cotyledons very small, 3 to 4 times smaller than the ovoid fleshy radicle. Hook. f. Fl. Br. Ind. IV. 51.

MALACCA: *Maingay* (K.D.) 1119; *Griffith* 3780. PERAK: at 4000 to 4500 feet near Larút, *King's Collector* 3840, 6905; at Gunong Ijuk, *Scortechini* 1185.



The chief peculiarity of this species is in its pollen-masses being elongate and having very small caudicles, and being therefore quite different from those of any other species we have examined. The Perak specimens have no flowers, and can therefore only be referred here tentatively, but we believe them to be correctly identified.

5. *DISCHIDIA RAFFLESIANA*, Wall. Pl. As. Rar. II. 35, t. 142 (1831), and Cat. 4208. A creeping epiphytic undershrub, milky, much branched, rooting on the trunks and branches of trees and often pendent from them; stems glabrous or slightly pubescent, terete, lower ones as thick as a goosequill. *Leaves* fleshy, coriaceous when dry, changing into pitchers; orbiculate or ovate-orbiculate, obtuse or mucronate sometimes acuminate at apex, rounded at base, slightly peltate; both surfaces glabrous; margins recurved; .75 to 1 in. in diam.; nerves faintly visible beneath; midrib slender; main nerves about 3 to 4 pairs, the lowest pair from the base and making an intramarginal nerve which the others join; petiole stout, flat, .15 to .25 in. long, sometimes longer; pitchers (*ascidia*) 2 to 5 in. long, fleshy, thick, oblong or ovate-oblong, slightly curved, obtuse, gibbous at base, the cavity filled with rootlets from the adjoining node. *Umbels* about 6- to 8-flowered, small, rounded, on a thickened tubercular rachis at the end of a long or short (usually .5 in. long) stout peduncle in the axil of the leaves; pedicels slender; buds ovoid; flowers pale yellow. *Calyx* membranous; lobes lanceolate, acute, ciliate, hirsute without. *Corolla* fleshy, urceolate; tube ovoid, pubescent without, .15 in. long; lobes short, obtuse, villous with somewhat retrorse stiff white hairs within, erect, .05 in. long. *Corona* of 5 processes, attached to the base of the staminal-column, each process on a stout base, deeply bilobed; lobes spatulate, incurved. *Staminal-column* short, conical; anther-cells parallel; appendages acuminate, erect, membranous; pollen-masses rather long, linear-oblong-spathulate, seated on cup-shaped clavate brown caudicles, which attach them to the oblong hardened dark pollen-carriers. *Follicle* 1, 2 to 3 in. long, curved, .3 in. broad below the middle, tapering thence to both ends; pericarp thin, smooth. *Seeds* .1 in. long, somewhat angled, oblong-obovate, narrowly winged on the margin, broadly winged and often dentate at base, truncate at tip, bearing a silky coma 1 in. or more long; albumen very scanty; cotyledons elliptic, obtuse, .025 in. long; radicle .5 in. long, cylindric. Griff. Notul. IV. 47, t. 386, fig. 6, and in Trans. Linn. Soc. XX. 387 and 391, tt. 17, 18; Dene. in DC. Prodr. VIII. 632; Miq. Fl. Ind. Bat. II. 512; Wight Contrib. 44; Hook. f. Fl. Br. Ind. IV. 50; K. Schum. in Engl. & Prantl Naturl. Pflanzenfam. IV. 2, 228, fig. 87 (from *Wallich*); Beccari Malesia II. 263. *D. viridescens*, Griff. l. c. 49. *Collyris major*, Vahl in Trans. Nat. Hist. Soc. Copenh. VI. 110; Wight Contrib. 66 (*in part*).

PERAK: at Larút, *Kunstler*. MALACCA: on islands, growing on *Anacardium*, *Maingay* (K.D.) 1117. PAHANG: near Pekan and Kwala Pahang, *Ridley* in Trans. Linn. Soc. Ser. 2, III. 320. SINGAPORE: *Wallich* 4208; *Kurz*; *Deschamps*; *Kunstler* (*King's Collector*) 1209.—DISTRIB. India (Cachar, Tenasserim), Borneo, Australia. A coast plant, abundant in dry spots near the sea, disappearing inland (*Ridley*). The pitchers are usually occupied by ants.

6. DISCHIDIA COMPLEX, Griff. Notul. IV. 50 (1854). A twining epiphyte, growing and rooting on the stems and branches of trees; stems very slender, terete. *Leaves* replaced by pitchers (*ascidia*), the pitchers subreniform, compressed, about 2 in. in diam., the orifice small, near the petiole, its margin inflexed, formed into a second pitcher much smaller than the outer one, opening on each side by an oblique opening deeply furrowed on the upper, carinate on the lower, side; the outer cavity filled with rootlets, the inner surfaces lurid purple. *Flowers* subumbellate, white, on thickened rachises at the ends of 1 to 3 in. long stout peduncles. *Corolla* with sub-globose tube, scarcely narrowed at the mouth; lobes broadly ovate, fleshy, inflexed; the throat of the corolla closed with a ring of hairs. *Corona*-processes with long narrow arms dilated at the tips. *Staminal-column* truncate; pollen-masses subobovate, attached by much dilated long keeled caudicles to the pollen-carriers (from Griffith). Hook. f. Fl. Br. Ind. IV. 51; Beccari Malesia II. 265.

MALACCA: *Griffith*, on trees.

7. DISCHIDIA BENGHALENSIS, Colebr. in Trans. Linn. Soc. XII. 357, t. 15 (1817). A fleshy epiphytic undershrub, rooting on the trunk and branches of trees, often matted and often hanging in flagelliform sprays; stems rather stout, as thick as a goosequill, glabrous, winged when dry. *Leaves* very fleshy, thick, subsessile; linear-oblong elliptic obovate or spatulate, obtuse and apiculate at apex, attenuate at base; .5 to 2 in. long, .25 to .75 in. broad; midrib and nerves scarcely ever visible, in dried specimens sometimes 3 to 5 pairs of main nerves at an acute angle with the midrib; petiole twisted, .1 to .15 in. long. *Umbels* axillary, very short-peduncled, about 10-flowered, usually on stout enlarged rachises; pedicels .05 to .1 in. long, slender; buds ovoid; flowers pale yellowish-white. *Calyx* fleshy; lobes ovate, .03 in. long. *Corolla* urceolate, glabrous on both sides; tube globose, .05 to .1 in. in diam.; lobes triangular, acute, .03 in. long, thickened within. *Corona* of 5 slender processes, membranous; stalk linear, branching in 2 falcate recurved subulate laciniae. *Staminal-column* short; anther-wings spreading; appendages short, connivent; pollen-masses falcate, truncate above, joined by a curved cup-shaped caudicle half as long as

themselves to the narrow ellipsoid pollen-carriers. *Style-apex* pyramidal. *Follicles* usually 1 only, very slender, straight, acuminate, 1·5 to 2·5 in. long, ·15 in. broad; pericarp thin, smooth. *Seeds* almost cylindric, only slightly compressed at the sides, rounded and minutely denticulate below, ·1 in. long, truncate at tip and bearing a copious white silky coma; testa thin, pale brown; albumen very scanty; cotyledons fleshy, ovate, ·05 in. long from a broad base; radicle stout, nearly as large. Spreng. Syst. Veg. I. 844; Wight Contrib. 43; Dene. in DC. Prodr. VIII. 631; Bot. Mag. t. 2916; Hook. f. Fl. Br. Ind. IV. 50. *D. cuneifolia*, Wall. Cat. 4206; Dene. l. c. 633. *D. spatulata*, Blume Bijdr. 1060; Miq. Fl. Ind. Bat. II. 512.

PERAK: *Scortechini* 1188; *King's Collector* 5751. SINGAPORE: *Maingay* (K.D.) 1121.—DISTRIB. India (E. Nepal, Sikkim, Assam and southwards), Java, Borneo.

8. DISCHIDIA NUMMULARIA, Br. Prodr. Fl. Nov. Holl. I. 461 (1810). A very slender epiphytic herb, rooting on the trunks and branches of trees; stems farinose, sometimes papillose or minutely puberulous, grey. *Leaves* fleshy, coriaceous when dry, farinose; orbicular, acute obtuse or apiculate at apex, rounded at base or sometimes slightly cuneate; under surface more or less papillose; margins often recurved; ·25 to ·75 in. in diam.; midrib and 2 to 3 pairs main nerves much branching, reticulating, scarcely visible even when dry; petiole 0 to ·05 in. long. *Umbels* few-flowered, lateral, on short rachises and short thick peduncles or nearly sessile; pedicels ·06 in. long; buds ovoid; flowers scarlet. *Calyx*-lobes minute, acute, membranous. *Corolla* urceolate; tube ·075 in. long, globose; throat villous within, with often retrorse hairs; lobes linear-subulate, ·025 in. long, erect, thickened. *Corona* of 5 processes attached to the base of the staminal-column, each process linear below, bifid above in 2 recurved spatulate lobes. *Staminal-column* short, conical; anther-wings conspicuous; anther-cells parallel; appendages membranous, acute; pollen-masses oblong-ellipsoid, attached by broad curved caudicles as long as themselves to the small brown horny pollen-carriers. *Style-apex* 5-lobed; tip conical. *Follicles* slender, curved, linear-lanceolate, long-acuminate, broad near the base (·6 in. when open); pericarp chartaceous, brown, smooth. *Seeds* flask-shaped, ·05 in. long, truncate at the tip and bearing a 1 in. long white silky coma; testa thin. Wall. Cat. 4204; Wight Contrib. 43; Dene. in Nouv. Ann. Mus. Par. III. 378, and DC. Prodr. VIII. 632; Bl. Bijdr. 1059; Miq. Fl. Ind. Bat. II. 507; Benth. Fl. Austral. IV. 345; Hook. f. Fl. Br. Ind. IV. 49; Beccari Malesia II. 2671, t. lxiii. 7 to 11; Prain Beng. Plants 699. *D. orbicularis*, Dene. l. c.; Miq. l. c. *Collyris minor*, Vahl in Act. Soc. Hafn. VI. 111; Wight Contrib. 67. *D. Gaudichaudii*,



Dene. *l. c.*; Miq. *l. c.* 508. "*Nummularia lactea minor prima*," Rumph. Herb. Amb. V. 472, t. 176, fig. 1.

PENANG: *Curtis*; *Wallich* 4204A. PERAK: *Scortechini* 1109. MALACCA: *Griffith* 3778; *Maingay* (K.D.) 1118. PAHANG: in heath country *Ridley* (see Trans. Linn. Soc., Ser. 2, III. 321). SINGAPORE: *Hullett* 136, 822; *King's Collector* 1270.—DISTRIB. India (Cachar, Chittagong, Tenasserim and Andaman Islands), Malay Archipelago, Australia. "A most noxious epiphyte in Singapore, draping and eventually killing trees" (*Ridley, l. c.*).

*Scortechini* 1135 is probably this species, but the leaves are slightly ovate. The specimen has no flowers. We cannot separate *D. Gaudichaudii* even by the retrorse hairs in the throat of the corolla, for the character is most difficult to be sure about in such minute flowers, and otherwise there seems to be no point of difference.

9. DISCHIDIA ALBIDA, Griff. Notul. IV. 46 (1854). A slender twining epiphytic herb or undershrub, rooting on the trunks and branches of trees; stems very slender, scabrid-puberulous or glabrous. *Leaves* fleshy, coriaceous when dry; ovate-acute and mucronate at apex, rounded or cordate and slightly peltate at base; glabrous and shining on both surfaces; margins slightly recurved; .5 to .75 in. long, .4 in. broad; nerves very faint when dry; midrib slender; main nerves 3 to 4 pairs, the lowest pair opposite starting from the base and forming an intramarginal looped nerve up to the apex, the remaining 2 to 3 pairs nearly horizontal joining the intramarginal nerve at the sinuses of the loops; reticulations few, netted; petiole stout, .1 to .15 in. long, puberulous. *Umbels* few-flowered, on minutely tubercular, more or less thick and elongated, rachises at the ends of .5 to .75 in. long rather stout peduncles; pedicels none or very slender, up to .06 in. long; buds ovoid, acute; flowers white tipped with pink. *Calyx* membranous; lobes ovate-acute, .04 in. long; scales minute. *Corolla* urceolate; tube ovate-globose, .15 in. long, white-villous at the throat; lobes triangular, erect, very small, with thickened margins. *Corona* very small, membranous, of 5 processes attached to the base of the staminal-column, linear, bifid; the lobes broad, flat, recurved. *Staminal-column* rather long, obconic below, conic above; base with a rounded protuberance; anther-wings prominent; anther-cells parallel; appendages acuminate; pollen-masses ellipsoid, granular, seated on cornucopia-like flattened caudicles as long as themselves, which connect them with the ovoid-oblong rather large brown pollen-carriers. *Style-apex* with conical tip. *Follicles* "very long-beaked, deeply channelled on the inner face" (*Griffith*). "*Seeds* with very long slender coma" (*Griffith*). Hook. f. Fl. Br. Ind. IV. 50.



PERAK: at Bujong Malacca, *Curtis*; Ulu Batang Padang and Gunong Batu Pateh, 3000 to 5000 ft., *Wray* 970, 1519; on Maxwell's Hill and at Thaiping, *Scortechini* 86, 313, 1227. MALACCA: at Toondook, *Griffith* 3781. JOHORE: at Gunong Pulai, 1800 ft., *G. King*.

10. DISCHIDIA HIRSUTA, Dene. in DC. Prodr. VIII. 632 (1844). A slender epiphytic trailing herb, rooting on the trunks and branches of trees; stems minutely papillose and slightly hispid-pubescent, nearly white when dry, scarcely ever over .05 in. in diam. *Leaves* fleshy, coriaceous and very pale when dry; broadly ovate, acute and mucronate at apex, rounded at base and slightly peltate; shining and lacunose above, minutely papillose beneath; margins recurved, often hispid-ciliate; .5 to 1 in. long, .5 to .7 in. broad; midrib and 2 to 3 pairs of main nerves prominent above when dry, the nerves horizontal, meeting a looped intramarginal nerve close to the edge; petiole very short, papillose. *Cymes* umbellate, 2- to 3-flowered, on very short rachises at the ends of short .15 to .2 in. long papillose axillary peduncles; buds ovoid; flowers dull red, the tube dark blood-red, the lobes rose-coloured. *Calyx* spreading; lobes membranous, ovate, .05 in. long; scales minute. *Corolla* urceolate; tube .2 in. long, globose below, contracted at the mouth, furnished within with a row of tufts of hair half-way up and two further rows at the throat, the lower alternate with, the upper opposite to, the short ovate-acute lobes, which are .05 to .1 in. long and bear 5 adnate fleshy scales behind the tufts of hair. *Corona* of 5 rather large very membranous processes from the back of the staminal-column between the wings, slender below, broad and bifid and recurved above; the lobes broadly rounded. *Staminal-column* conical; the anther-wings prominent, rounded at base; anther-cells parallel; appendages acuminate, membranous, erect; pollen-masses oblong-clavate, obtuse, seated on upcurved brown caudicles with cup-like top, which are half as long as the pollen-masses and connect them to the large conical dark brown pollen-carriers. *Style-apex* very soft; tip long-conical. *Follicles* "3 in. long, curved, linear-lanceolate, glabrous" (*Scortechini*). *Miq.* Fl. Ind. Bat. II. 599; *Hook. f.* Fl. Br. Ind. IV. 50; *Bot. Mag.* t. 7853. *D. fasciculata*, Dene. l. c.; *Miq.* l. c. *D. Brunoniana*, *Griff.* Notul. IV. 44, and *Ic. Pl. Asiat.* t. 410A, fig. 1 (somewhat incorrect). *Leptostemma hirsutum* and *fasciculatum*, *Blume Bijdr.* 1058.

PENANG: at Bato Fereng, *Curtis* 1897. PERAK: at Waterfall Hill, *Wray* 137; *Scortechini* 180; at Larut, 200 to 300 ft., *King's Collector* 6691. DININGS: at Pangkore Island, *Scortechini* 1077. MALACCA: *Griffith*; *Maingay* (K.D.) 1120. SINGAPORE: *Ridley* 2730.—DISTRIB. Burma (in Tenasserim (*Helper*), at Mergui in mangrove forests (*Griffith* 3782)), Java, Borneo.

11. *DISCHIDIA ACUTIFOLIA*, Maingay MS.; Hook. f. Fl. Br. Ind. IV. 51 (1883). A slender twining epiphytic undershrub, rather distantly rooting on the stems and branches of trees; stems terete, glabrous, striate when dry. *Leaves* coriaceous, pergamaceous when dry; lanceolate or ovate-lanceolate; shining and glabrous on both surfaces; margins recurved; 2·5 to 4 in. long, .75 to 1·25 in. broad; midrib slender, impressed above when dry; main nerves 6 to 8 pairs, the lowest pair close to the lower margin, all at from 40° to 60° with the midrib, straight or curving to join an intramarginal looped nerve; reticulations netted; petiole stout, .25 in. long. *Umbels* few-flowered, in pairs on thickened rachises at the ends of .5 to 1·5 in. long peduncles; pedicels very short; buds conical; flowers pale yellow with pink tips. *Calyx* very thin, membranous, hyaline; lobes ovate-acute, .025 in. long. *Corolla* urceolate; tube globose, .05 in. long, throat with a row of usually erect stiff hairs; lobes as long, villous within, triangular, acute, thickened. *Corona* of 5 exceedingly thin membranous hyaline processes; stem subulate from a broad base, top obtuse, rounded, with 2 rather short spatulate recurved arms. *Staminal-column* somewhat elongate, filament portion membranous; anther-wings rounded; appendages crenate with erect acuminate tips; pollen-masses oblong, truncate, on cornucopia-shaped curved caudicles as long as themselves, and connected by them to the very slender lanceolate brown pollen-carriers. *Style-apex* pyramidal. *Fruit* not known.

PERAK: *Scortechini*. MALACCA: *Maingay* (K.D.) 1122.

We were only able to dissect one flower, and that with some difficulty. In his MS. notes (Vol. IV. pp. 48, 67) Maingay says: "Leaves of staminal-corona minute, so closely adpressed to the anthers that I question if in dried specimens of so minute a plant (flower?) they could be discoverable at all; obtuse with short brachia." The corona-processes are, in fact, excessively thin, but they can be separated with care.

12. *DISCHIDIA CORDIFOLIA*, King & Gamble, n. sp. A creeping epiphytic undershrub, rooting on the trunks and branches of trees; stems about as thick as a crowquill, terete; internodes long. *Leaves* fleshy, thinly coriaceous when dry; ovate, bluntly acute at apex, rounded or slightly cordate at base; both surfaces glabrous; margins slightly recurved; 1·5 to 2·5 in. long, 1 to 1·75 in. broad; 5- to 7-nerved at the base; midrib slender; marginal pair of nerves very short and faint, second pair curving up to about half the length of the leaf, third pair at an angle of about 30° with the midrib, curving near the margins to form an intramarginal nerve rejoining the midrib a little below the tip; other main nerves none; secondary nerves about 2 pairs; reticulations irregularly netted; petiole .5 in. long, broad, flattened. *Umbels* few-flowered, in pairs on tubercular rachises about .15 in. long at the ends of stout

peduncles .5 in. long; pedicels very short, slender; buds ovoid. *Calyx* membranous; lobes ovate-acute, .05 in. long; scales small. *Corolla* campanulate; tube .1 in. long, glabrous on both sides; lobes .075 in. long, thickened, glabrous. *Corona* of 5 very thin hyaline processes, about .04 in. long from the back of the anthers between the wings, linear-stalked with orbicular rounded tops and sagittate lobes. *Staminal-column* attached to the base of the corolla-tube; filament part short; anther-cells parallel; appendages short, acute; pollen-masses ellipsoid, on caudicles nearly as long as themselves, which attach them to the narrowly oblong pollen-carriers; the caudicles curved upwards to a cup-like oblique mouth, and broadly membranously winged on the inside. *Style-apex* short, blunt. *Fruit* not known.

PERAK: at Maxwell's Hill, 3000 ft., *Scortechini* 424, 516.

13. *DISCHIDIA MONTICOLA*, King & Gamble, n. sp. A trailing epiphytic undershrub, rooting at intervals on the trunks and branches of trees; stems slender, terete; internodes long. *Leaves* fleshy, thinly coriaceous when dry; ovate or ovate-lanceolate, acuminate at apex, rounded or attenuate at base; both surfaces glabrous; margins slightly recurved; 1.5 to 3.5 in. long, .75 to 1 in. broad; 5-nerved; the midrib slender; outer pair of basal nerves short, reaching about the middle of the leaf, second pair at an angle of about 20° with the midrib, forming a looped intramarginal nerve till close to the midrib; main nerves 2 to 3 pairs, short, inconspicuous, joining the midrib to the sinuses of the looped nerve; reticulations netted, irregular; petiole .25 in. long, somewhat twisted. *Umbels* few-flowered (?), in pairs on tubercular rachises .2 to .3 in. long at the end of a .75 to 1.75 in. long straight lateral peduncle; pedicels very short, slender; buds ovoid; flowers pale green (Wray). *Calyx* membranous; lobes ovate-acute, puberulous without, .05 in. long; scales rather large. *Corolla* campanulate, .125 in. long; tube glabrous; lobes also glabrous, thickened, scarcely over .025 in. long. *Corona* of 5 very thin membranous processes, each linear-stalked with a rounded bluntly sagittate head. *Staminal-column* short; anther-wings broad; anther-cells parallel; appendages very long-acuminate; pollen-masses ellipsoid, on cornucopia-shaped caudicles as long as themselves, which connect them to the slender oblong pollen-carriers. *Style-apex* with a short conical tip. *Fruit* not known.

PERAK: at camp on Ulu Batang Padong, 4900 feet, Wray 1503; on Canfield's Hill, 4000 feet, *Scortechini* 423, &c.

Scortechini has marked his specimens "*D. sagittata*, Dcne.," but they do not agree at all well with the descriptions in DC. Prodr. VIII. 631. There are no specimens of *D. sagittata* in the Kew Herbarium, but the descriptions give the leaves as obtuse at apex and attenuate into the petiole at base, which hardly suits



*D. monticola*. In the glabrous flowers *D. monticola* and *D. cordifolia* come very near to each other.

14. *DISCHIDIA SCORTECHINII*, King & Gamble, n. sp. A slender glabrous creeping epiphytic undershrub, sparingly rooting on and often pendulous from the trunks and branches of trees; stems terete; internodes long, 2 to 4 in. or more. *Leaves* fleshy, pergamaceous when dry; ovate-lanceolate, attenuately acuminate at apex, rounded at base; glabrous on both surfaces; 2 to 2.5 in. long, about .5 in. broad; 3- to 5-nerved; midrib slender, raised beneath, sometimes with a gland at the base; lowest pair of nerves short and faint; next pair prominent forming an intramarginal looped nerve .1 to .15 in. from the midrib nearly or quite to the tip; main nerves about 4 to 5 pairs, leaving the midrib at nearly right angles, and joining the intramarginal nerve at the loop-sinuses; reticulations netted; petiole .15 to .20 in. long, rugose. *Umbels* few- (5- to 6-) flowered, on short rounded tubercular thick rachises at the ends of stout axillary .3 in. long peduncles; pedicels reddish, slender, .05 in. long; buds lanceolate-ovoid, .15 to .2 in. long; flowers white tipped with scarlet. *Calyx* membranous; lobes ovate-acute, .05 in. long, slightly puberulous without; scales very minute. *Corolla* urceolate; tube ovoid, glabrous without, pubescent above within, .125 in. long; throat gradually contracted; lobes erect, .1 in. long, thickly villous within, especially in their lower half. *Corona* of 5 exceedingly thin membranous processes, attached to the backs of the anther part of the column, each process on a narrow base, soon spreading into a rounded obtusely sagittate tip. *Staminal-column* rather long; filament portion free; anther-wings broad, shining, horny; anther-cells parallel, with acuminate, erect, connivent, membranous appendages; pollen-masses oblong-ellipsoid, attached by slender caudicles as long as themselves to the very narrow slender pollen-carriers; the caudicles cornucopia-shaped, with a narrow membranous wing on the inside edge. *Style-apex* long-conical, membranous. *Follicles* not known.

PERAK: *Scortechinii* 543.

We at first thought that this was *D. lanceolata*, Dene. (*Leptostemma lanceolatum*, Bl. Bijdr. 1057), but in that species the bases of the leaves are markedly attenuate into the broad flat petiole, and the venation is more strongly 3- to 5-nerved.

15. *DISCHIDIA TUBULIFLORA*, King & Gamble, n. sp. A slender creeping epiphytic undershrub, rooting on the trunk and branches of trees; stems wiry, puberulous. *Leaves* fleshy, coriaceous when dry; ovate or ovate-lanceolate, acute or acuminate at apex, rounded at base; glabrous on both surfaces, shining above and wrinkled when dry; margins recurved; .75 to 1.25 in. long, .3 to .6 in. broad; nerves only



clear on under-surface when dry; midrib slender, with usually a gland at the base above; main nerves 3 to 5 pairs, acutely curved to join in a looped intramarginal nerve; petiole .1 to .25 in. long, pubescent. *Umbels* few-flowered, on a cylindrical tubercular rachis about .25 in. long at the end of a thick .15 in. long peduncle; buds slender, cylindric-clavate, reaching .4 to .5 in. long. *Calyx* membranous; lobes ovate-acute, .05 in. long, pubescent without. *Corolla* tubular, urceolately inflated below, then contracted in a neck having a small swelling in the middle; glabrous without, glabrous within, except a densely villous ring at the swelling; tube .3 to .4 in. long; lobes linear, erect, .1 to .15 in. long, villous within. *Corona* of 5 exceedingly thin hyaline processes, which are inserted between the anther-wings, have narrow stalks, and are broadly rounded above and sagittate below. *Staminal-column* elongated; filament part cylindric, .075 in. long; anther-wings horny, tailed at base; anther-cells parallel, with long-acuminate erect connivent appendages; pollen-masses oblong-ellipsoid, on slender caudicles as long as themselves, and connecting them with the ovoid-acute pollen-carriers; the caudicles cornucopia-shaped, and having a hyaline inner margin. *Style-apex* long, subulate-acuminate. *Follicle* 1, slender, curved, 2 in. long, .1 in. broad, acuminate at tip; pericarp thin, striate, glabrous. *Seeds* minute, linear, .1 in. long, tipped with a white silky coma; testa thin, pale.

PERAK: *Scortechini* 256, 465; *King's Collector* 2100.

The description is from *Scortechini* 465, the only specimen with flowers and fruit, and the only one, consequently, quite certain.

#### SPECIES OF WHICH LEAVES ONLY KNOWN.

16. *DISCHIDIA DESCHAMPSII*, King & Gamble, n. sp. A twining apparently epiphytic undershrub, rooting on the stems and branches of trees; branches slender, terete. *Leaves* coriaceous; elliptic or elliptic-ovate, bluntly acute at apex, somewhat rounded at base; glabrous on both surfaces and somewhat shining; margins recurved; 1.5 to 3 in. long, .75 to 1 in. broad; midrib slender, raised beneath when dry; main nerves about 5 pairs, the lowest pair from the base forming a looped intramarginal nerve, which is joined at its sinuses by the others, which are at an angle of about 70° with the midrib; reticulations irregular, prominent, all raised on both surfaces when dry; petiole thick, .15 to .25 in. long. *Umbels* on thickened rachises often .5 to .75 in. long, at the ends of stout peduncles about 1 in. long. *Flowers* and *Fruit* unknown.

SINGAPORE: roadsides, *Deschamps*.

## 29. PYCNORHACHIS, Benth.

A hairy twining undershrub. *Leaves* opposite. *Flowers* in reflexed pairs, spirally disposed round the long fleshy branches of an axillary racemiform cyme. *Calyx* 5-partite; scales 5 to 10. *Corolla* turbinate, with short tube, deeply 5-fid; lobes valvate, slightly twisted to the left. *Corona*-scales 5, spreading at the base of the staminal-column opposite the anthers. *Staminal-column* short, adnate to the middle of the corolla-tube; anthers erect, with membranous, hyaline appendages; pollen-masses 1 in each cell, long, slender, cylindric, waxy, erect, attached by short caudicles to the pollen-carriers. *Ovary* of 2 carpels, sunk in the calyx-tube; style-apex 5-angled, obtusely conical, much shorter than the anthers. *Fruit* of curved, smooth, cylindric, obtuse follicles. *Seeds* comose.—DISTRIB. One species only.

PYCNORHACHIS MAINGAYI, Hook. f. in Fl. Br. Ind. IV. 63 (1883). Branches flexuose, hispid with spreading tawny hairs. *Leaves* oblong-obovate, abruptly cuspidate-acuminate at apex, narrowly cordate at base; both surfaces hispidly hairy with bulbous-based hairs, especially on the nerves; 4 to 6 in. long, 1·5 to 2 in. broad; midrib prominent beneath; main nerves 10 to 12 pairs, curving upwards and joined by prominent transverse reticulations; petiole ·25 to ·5 in. long, villous. *Cymes* 3 to 6 in. long; peduncle 1 to 2 in. long, thick; branches usually 1 to 3, ·3 in. in diam. minutely pubescent flower-pairs on rounded tubercles; pedicels short; buds conical, long-acuminate. *Calyx* minutely red-hairy without, glabrous within; lobes linear-lanceolate, ·1 in. long. *Corolla* deep purple; tube very short, thickened, with a fringed annulus; lobes about ·25 in. long, subulate-lanceolate from a broad base. *Corona* of 5 thickened fleshy obtuse processes on the backs of the anthers. *Staminal-column* short; appendages long, subulate, hyaline; pollen-masses clavate, slender, attached by minute caudicles to the bases of the linear clavate pollen-carriers. *Style-apex* deeply 5-lobed; the lobes running up to a rounded apiculus. *Follicles* 5 in. long, ·7 in. broad, cylindric, curved in sickle-shape; pericarp glabrous. *Seeds* comose.

MALACCA: *Maingay* (K.D.) 1141.

The description, like that of Fl. Br. Ind., is chiefly taken from the full notes given in *Maingay* MS. Vol. IV. 64.

## Tribe V.—CEROPEGIÆ.

Stamens with their filaments connate into a tube, and adnate to the style-apex at the top. Anthers erect or incumbent over the style-apex, with or without appendages. Pollen-contents of each anther-cell united in a waxy mass; pollen-masses pellucid on the margin or at

the apex, attached in pairs to the carriers by short caudicles, erect or horizontal in the cells, never pendulous.

Corona double: outer corolline, of small processes in the sinuses of the corolla-lobes; inner staminal, annular; flowers small; corolla rotate .. .. . 30. LEPTADENIA.  
Corona double, both staminal: outer cup-shaped, inner usually erect, subulate; flowers rather large; corolla tubular .. 31. CEROPEGIA.

### 30. LEPTADENIA, R. Br.

Shrubs, twining or erect, and then with stiff much-branched rush-like stems. *Leaves* opposite, variable, sometimes absent. *Flowers* small, in umbellate, lateral, sessile or pedunculate, many-flowered cymes. *Calyx* 5-lobed to the middle or further; scales absent. *Corolla* deeply 5-lobed, rotate or with a short campanulate tube and spreading lobes; valvate in bud. *Corona* double; outer corolline, of 5 short transverse or rounded fleshy processes alternating with the lobes of the corolla at the sinuses; inner staminal, of a raised undulate fleshy ring at the base of the staminal-column. *Staminal-column* arising from the tube of the corolla, to which the filaments are sometimes adnate; anthers incumbent on the style-apex, with minute or no appendages; pollen-masses 1 to each anther-cell, suberect or erect, ovoid, with a pellucid apex, attached in pairs by fleshy caudicles to the pollen-carriers. *Ovary* of 2 distinct carpels; style-apex conical, with a 5-angled base; tip often bifid. *Fruit* of usually 1 thick smooth follicle. *Seeds* small, ovate-oblong, comose.—DISTRIB. Five or six species, three being twiners and two erect shrubs. Four species are found in Central Africa, one extending through Egypt and Arabia into Western India, one in Madagascar, and one in India and Malaya.

LEPTADENIA RETICULATA, W. & A. in Wight Contrib. 47 (1834). A hoary twining shrub; stems with corky deeply cracked bark; branchlets terete, glabrous or hoary-puberulous. *Leaves* thinly coriaceous; subdeltoid or ovate or ovate-oblong or ovate-lanceolate, acute at apex, rounded or cuneate at base; both surfaces pale, glabrous or more or less finely pubescent; 1.5 to 3 in. long, .75 to 1.75 in. broad; midrib rather broad, without basal glands, but sometimes with a minute tuft of hair at the base; main nerves 5 to 7 pairs, spreading, faint; reticulations netted, obscure; petiole .25 to .75 in. long. *Cymes* many-flowered, hoary-puberulous, shorter than the leaves, often in pairs on the peduncles; peduncles .25 to .75 in. long; bracts minute, clustered at the thickened bases of the umbels; pedicels slender, up to .5 in. long; buds globose; flowers greenish-yellow. *Calyx* rotate-campanulate, divided to about the middle, pubescent without; lobes ovate-oblong,

·05 in. long. *Corolla* rotate, with a short tube; lobes thick, ovate-lanceolate, ·1 in. long, pubescent, and with a small hairy protuberance on the inner face near the tip. *Corona*: corolline of 5 fleshy truncate or acute processes at the sinuses, villous on the back and tips; staminal of a sometimes obscure, annular, undulate, ring below the anthers. *Staminal-column* adherent below to the corolla-tube; filaments united, thin; lower part of anthers thickened, upper part incumbent over the style-apex; appendages minute; pollen-masses ovoid, reticulate, with a pellucid apex, attached by moderately long, often elastic, clavate, pellucid caudicles to the small oblong pollen-carriers. *Style-apex* 5-rayed, conical, sometimes bifid. *Follicles* subwoody, 2·5 to 3·5 in. long, ·75 in. broad, lanceolate, with a blunt shortly curved beak, keeled on the ventral surface; pericarp smooth, pale grey when dry, thick. *Seeds* narrowly ovate-oblong, acute, infolded, broadly winged, ·25 in. long, ending in a 1 to 1·5 in. long white silky coma; testa thick; cotyledons fleshy; embryo small. Wight Ic. t. 350; Wall. Cat. 8197; Dene. in DC. Prodr. VIII. 628; Miq. Fl. Ind. Bat. II. 503; Dalz. & Gibs. Bomb. Fl. 152; Hook. f. Fl. Br. Ind. IV. 63; Trimen Fl. Ceyl. III. 164; Cooke Fl. Bomb. II. 172. *L. appendiculata*, Dene. l. c.; Miq. l. c. *L. imberbis*, Wight Contrib. 48; Wall. Cat. 8198; Dene. l. c. *L. brevipes*, Wight Cat. 1536. *Cynanchum reticulatum*, Retz. Obs. II. 15. *C. asthmaticum*, Herb. Ham. 766. *Secamone canescens*, Smith in Rees Cycl. *Asclepias suberosa*, Roxb. Fl. Ind. II. 38. *Gymnema aurantiaca*, Wall. MSS.

SINGAPORE: *Lobb* 333.—DISTRIB. Northern Western and Southern India, Burma, Ceylon.

*Lobb's* specimen has ovate-lanceolate leaves, acute corolline corona-processes, and almost no trace of the ring forming the staminal-corona, but otherwise appears to be the same as the Indian plant.

### 31. CEROPEGIA, Linn.

Perennial herbs, erect or twining. *Rootstock* a tuber or a fascicle of thick fleshy roots. *Leaves* opposite, sometimes minute or 0. *Flowers* usually moderate-sized or large, of various often singular forms, solitary, in pairs or in umbellate or racemose cymes, lateral, rarely terminal. *Calyx* 5-partite, with 5 glandular scales within. *Corolla* tubular, usually more or less inflated at the base, straight or curved, 5-lobed; the lobes free or more or less connate at their tips, valvate in bud. *Corona* double, arising from the staminal-column; outer cup-shaped, entire or 5- to 10-toothed, or of 5 bifid lobes more or less adnate to the inner corona-lobes and often appearing to form one



series with them, or reduced to minute pouches alternating with the stamens; inner of 5 short or long processes opposite the anthers and incumbent on them or erect, dorsally adnate at their base to the cup of the outer corona or laterally to its lobes, when the corona appears to be formed of 5 lobes with a tooth on each side at their base. *Staminal column* arising a little above the base of the corolla, short and, with the corona, included in its inflated basal part; anthers erect, ascending or incumbent on the top of the style-apex, without appendages; pollen-masses erect, ascending or subhorizontal, 1 in each anther-cell, subsessile on, or attached in pairs by short caudicles to, the pollen-carriers. *Ovary* of 2 carpels; style-apex truncate or shortly conical, not exserted. *Fruit* of 1 or 2 lanceolate or linear-fusiform, acuminate, smooth follicles. *Seeds* comose.—**DISTRIB.** A large genus of 80 or more species, found in Africa, India, Malaya and Tropical Australia.

*CEROPEGIA LUCIDA*, Wall. Pl. As. Rar. II. 33, t. 139 (1831), and Cat. 8133. A twining shrub, with irregularly fascicled fibrous roots; branchlets glabrous, smooth, more or less angular when dry. *Leaves* fleshy when green, membranous when dry; ovate- or oblong-lanceolate, acuminate at apex, acute or somewhat obtuse at base; glabrous on both surfaces; 4 to 7 in. long, 1.5 to 3 in. broad; midrib slender; main nerves 6 to 7 pairs, obscure, acutely curving upwards; reticulations irregular, scarcely visible; petiole .5 to 1.5 in. long. *Cymes* up to 3 in. long, 1 to 3 together at the nodes; peduncles reddish, stout, 1 to 2 in. long, bearing umbellate racemes with a .25 to .5 in. long thickened rachis, and with white rounded glands and linear-subulate bracts; pedicels slender, .5 in. long; flowers green, spotted with purple in the tube and with purple-brown tips to the lobes. *Calyx* very deeply cleft; lobes linear-subulate, slender, recurved, .4 to .5 in. long; glandular scales rather large, ovate, flat. *Corolla* 1.5 to 2 in. long, curved, glabrous without, also within, except at the base of the tube, which is sparsely villous; tube scarcely inflated below, broadly funnel-shaped below the lobes; lobes lanceolate, at first spreading, afterwards inflexed and connate at the dilated long-ciliate tips. *Corona*-processes: outer 10-lobed, lobes short, triangular, long-ciliate; inner linear-spathulate, connivent at the tips. *Staminal-column* short; pollen-masses nearly globose, subsessile on the clavate pollen-carriers. *Style-apex* 5-angled; apiculus conical. *Fruit* not seen. Wight Contrib. 33; Dene. in DC. Prodr. VIII. 641; Hook. f. Fl. Br. Ind. IV. 73.

**PENANG:** at Penara Bukit, 1000 ft., *Curtis* 1007.—**DISTRIB.** India (Silhet and Cachar), Burma.

## Family LXXVII. LOGANIACEÆ.

Trees, shrubs or herbs, sometimes climbers. *Leaves* opposite, rarely ternate, simple; stipules various or absent. *Flowers* hermaphrodite or, by abortion, subdioecious, in terminal or axillary, simple or compound, cymes; the cymes sometimes subcapitate or reduced to solitary flowers. *Calyx* small, inferior, its limb imbricately 4- or 5-toothed or -lobed. *Corolla* tubular, funnel-shaped or campanulate; limb with 4 or 5 lobes or teeth, imbricate, valvate or contorted. *Stamens* 4 or 5, inserted on the corolla-tube, alternate with the lobes; anthers 2-celled, their dehiscence introrse, longitudinal, rarely 1-celled, divaricate, with confluent tips. *Carpels* 2, connate into a free 2-celled ovary; ovules 1 or more in each cell; placentas on the septum or basal at the inner angle; style simple; stigma capitate, 2-fid or 2-partite. *Fruit* a septicidal capsule or a berry, 1- to many-seeded. *Seeds* various; albumen fleshy or cartilaginous; embryo straight.—DISTRIB. About 450 species; tropical and sub-tropical.

Ovary with many ovules in each cell (Tribe I. EULOGANIEÆ):—

Herbs; corolla valvate; capsule didymous:—

- |  |    |                |
|--|----|----------------|
| Cymes 2- or 3-chotomous; flowers 5-merous .. | .. | 1. MITREOLA.   |
| Flowers solitary or clustered, 4-merous ..   | .. | 2. MITRASACME. |

Shrubs (often scandent) or trees:—

Fruit dehiscent, capsular, 2-celled:—

- |                            |    |              |
|----------------------------|----|--------------|
| Corolla-lobes imbricate .. | .. | 3. BUDDLEIA. |
| Corolla-lobes valvate ..   | .. | 4. NORRISIA. |

Fruit indehiscent:—

- |  |    |               |
|--|----|---------------|
| Corolla-lobes contorted in æstivation .. | .. | 5. FAGRÆA.    |
| Corolla-lobes valvate in æstivation ..   | .. | 6. STRYCHNOS. |

Ovary with a single ovule in each cell (Tribe II. GAERTNERIÆ) 7. GAERTNERA.

## 1. MITREOLA, Linn.

Herbs with opposite membranous leaves and small or membranous stipules. *Cymes* 2- to 3-chotomous, terminal, or peduncled and axillary. *Flowers* small, white, often secund on the ultimate branches of the cymes. *Sepals* lanceolate. *Corolla* urn-shaped, with 5 small valvate lobes. *Stamens* 5, included. *Ovary* 2-celled; styles 2, short, at first connate and crowned by the small hairy stigma, ultimately divergent; ovules many in each cell, attached to peltate placentas. *Capsule* obovoid, laterally compressed, truncate or 2-horned; carpels dehiscing by separating from above downwards from each side of the septum. *Seeds* numerous, minute, globose or elongate; albumen fleshy; embryo linear.—DISTRIB. Species 4; 2 of them American, 2 Asiatic.

1. MITREOLA OLDENLANDIOIDES, Wall. Cat. 4350 (1829). Annual,

erect, 6 to 18 in. high. *Leaves* linear-lanceolate, narrowed at both ends, nearly glabrous, about 2 in. long and .75 in. broad; petiole .25 in. long. *Cymes* 2 to 6 in. long, often numerous, terminal and axillary, dichotomous; bracts lanceolate, less than .1 in. long. *Flowers* subsessile, under .1 in. long; capsules 2-horned, secund. *Seeds* twice as long as broad, trigonous. A. DC. Prodr. IX. 9; Hook. Ic. Plant. 827; Miq. Fl. Ind. Bat. II. 360; Benth. in Journ. Linn. Soc. I. 91; Clarke in Hook. f. Fl. Br. Ind. IV. 79. *M. paniculata*, Wall. Cat. 4349; Wight Ic. 600 (*inaccurate*); A. DC. l. c. *M. inconspicua*, Zoll. et Mor. Vers. (1845 to 1846) 55.

Said to occur in Kedah, but no specimen seen.—DISTRIB. Andaman Islands, Burma, Central Provinces of British India, Malay Archipelago, Australia.

## 2. MITRASACME, Labill.

Small herbs, with opposite leaves and stipules forming a minute sheath. *Flowers* small, white, terminal or axillary, solitary, clustered or in irregular umbels. *Calyx* campanulate, 4-fid. *Corolla* urceolate, with 4 valvate or reduplicate sometimes spreading lobes. *Stamens* 4, included; filaments rather short, adnate to the tube; anthers ovate with cordate bases, connective often produced beyond the apex of the parallel cells. *Ovary* 2-celled; styles 2, connate, separating from the base upwards, finally divergent; stigma capitate or two-lobed; ovules many in each cell, on peltate placentas. *Capsule* subglobose, laterally subcompressed, truncate, or somewhat 2-horned, dehiscent by the separation from above downwards of the carpels from the septum on each side. *Seeds* numerous, minute, subglobose; testa smooth, reticulated; albumen fleshy; embryo straight.—DISTRIB. 28 species, in Eastern Asia, New Zealand, Australia.

MITRASACME POLYMORPHA, R. Br. Prod. Nov. Holl. I. 452 (1810). An erect annual herb, 3 to 9 in. high, often with a long erect branch from the uppermost leaf-axil. *Stem* slender, glabrous except for a few slender hairs in the leafy part. *Leaves* sessile, oblong, blunt, confined to the lower inch or two of the stem, glabrous, .2 to .3 in. long, and about .05 in. broad. *Umbels* terminal, or at the ends of the scanty branches, few-flowered, very lax; pedicels much longer than the flowers, slender, unequal, glabrous. *Flowers* .15 in. long. *Calyx* with 4 spreading, triangular, acute lobes. *Corolla* twice as long as the calyx; throat hairy. *Capsule* subglobular, glabrous, about .1 in. across. A. DC. Prodr. IX. 10; Benth. Fl. Austral. IV. 353; Solereder in Engl. & Prantl Naturl. Pflanzenfam. IV. 2, 35, Fig. 18A-C. *M. capillaris*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. I. 420, and Cat. 4348; Don Prodr.

Fl. Nep. 129; A. DC. *l. c.* 11; Benth. in Journ. Linn. Soc. I. 92; Miq. Fl. Ind. Bat. II. 362. *M. trinervis*, Spanoghe in Linnæa XV. 335 (1841); A. DC. *l. c.* 560. *M. malaccensis*, Wight. Ic. 1601. *Linnophila campanuloides*, Benth. in Wall. Cat. 3908.

MALACCA: *Goodenough* 669. — **DISTRIB.** Northern and Central India, Burma, Malay Archipelago, China, Australia.

### 3. BUDDLEIA, Linn.

Trees, shrubs, or herbs. *Leaves* opposite, entire or crenate, united by a stipular line. *Cymes* in dense globose or corymbiform cymes, axillary or in a terminal thyrsoid panicle. *Calyx* campanulate, 4-merous. *Corolla* urn-shaped; lobes 4, imbricate in bud. *Stamens* 4, adnate to the corolla-tube; anthers subsessile, ovate or oblong, with cordate or 2-lobed bases; cells parallel. *Ovary* 2-celled; style linear, clavate; ovules numerous in each cell; stigma terminal or decurrent on two sides. *Fruit* a septicidally 2-valved capsule; the valves entire or bifid. *Seeds* many, oblong or fusiform; testa usually lax, or expanded into a wing or tail; albumen fleshy; embryo straight.—**DISTRIB.** About 100 species; tropical and subtropical regions of the Old World.

Under surfaces of leaves, young branches, and inflorescence  
with minute yellowish pubescence .. .. 1. *B. asiatica*.

Under surfaces of leaves, young branches, and inflorescence  
densely rusty-tomentose .. .. 2. *B. madagascariensis*.

1. BUDDLEIA ASIATICA, Lour. Fl. Cochinch. 72 (1790). A shrub, 3 to 6 ft. high (sometimes as much as 15 ft.); young branches thicker than a crowquill, covered, like the branches of the inflorescence, with a subdeciduous, minute yellowish pubescence. *Leaves* opposite, membranous; oblong-lanceolate, the apex much acuminate, the base usually much narrowed; edges entire or with minute distant teeth; upper surface dark when dry, glabrous except the puberulous depressed midrib; lower surface pale yellowish-brown, minutely pubescent; main nerves 5 to 7 pairs, curving abruptly upwards and interarching rather far from the edge, thin but prominent like the midrib on the lower surface, obscure on the upper; length 2·5 to 6 in., breadth ·6 to 1·5 in.; petiole ·1 to ·35 in. long. *Inflorescence* terminal, consisting of numerous 3-flowered sessile cymules, arranged in spikes to form a few-branched lax panicle, 5 to 9 in. long. *Flowers* ·15 in. long, on very short pedicels. *Calyx* half as long as the corolla, pubescent externally; lobes erect, acuminate. *Corolla* glaberrulous, lobes blunt. *Ovary* narrowly oblong, tapering to the apex; stigma large, capitate, corrugated. *Capsule* ·2 in. long. Benth. in DC. Prodr. X. 446; Bot. Mag. t. 6323; Brandis For. Fl. 318; Kurz For. Fl. II. 250; Miq. Fl. Ind. Bat.



II. 363; Clarke in Hook. f. Fl. Br. Ind. IV. 82. *B. Neemda*, Ham. in Wall. Cat. 6401; Roxb. Fl. Ind. ed. Carey and Wall. I. 411; Reichenb. Ic. Bot. Exot. 21. *B. discolor*, Roth Nov. Spec. 83; Wight Ill. 165B, and Ic. 894. *B. salicina*, Lamk. Ill. I. 291. *B. acuminatissima*, Blume Bijdr. 743. *B. subserrata*, Don Prodr. Fl. Nep. 92. *B. virgata*, Blanco Fl. Filip. 57. *B. serratula*, Roth l. c. 82.

In all the Provinces; common.

2. *BUDDLEIA MADAGASCARIENSIS*, Lamk. Encyc. I. 513 (1783). A slender creeper, 60 to 80 ft. long; young branches half as thick as a crow-quill, covered, like the under surfaces of the leaves the inflorescence and the outer surface of the calyx, with dense pale brown tomentum. *Leaves* coriaceous; elliptic-lanceolate, the apex shortly acuminate, the base cuneate; upper surface very dark when dry, glabrous, reticulate; main nerves about 8 pairs, spreading, slightly prominent on the lower surface and depressed on the upper; length 2 to 3·5 in.; breadth ·6 to 1 in.; petiole ·3 to ·5 in. *Inflorescence* a terminal, often leafy, thyrsoid panicle, 8 to 12 in. long, with numerous diverging branches from 1 to 2 in. long (shorter near the apex), bearing pedunculate few-flowered umbellate cymules; bracteoles at base of branches linear, about ·5 in. long. *Flowers* orange, ·4 in. long, sessile, on very short pedicels. *Calyx* obovoid-ellipsoid; teeth short, blunt; tube glabrous within. *Corolla* salver-shaped; lobes of the limb blunt, short, reflexed, glabrescent; tube cylindric, ·35 in. long, cottony without, sparsely hairy inside like the narrowly oblong ovary. *Anthers* sessile near the mouth of the corolla-tube. *Capsule* globular, ·35 in. in diam.; pericarp thick, scaly, dark-coloured. Lamk. Ill I. t. 69, fig. 3; Benth. in DC. Prodr. X. 447; Bot. Mag. 2824.

PENANG: *Hullett* 121; *Murton* 4; *Ridley* 7049; *King's Collector* 1340. PERAK: *King's Collector* 5201; MALACCA: *Maingay* (K.D.) 1033/2; *Wallich* 6402. A native of Madagascar, but in some spots within our area almost naturalised.

#### 4. *NORRISIA*, Gardn.

A shrub; the young parts pubescent. *Leaves* opposite; petioles dilated at the base and subconnate. *Flowers* small, yellow. *Calyx* small, 5-lobed. *Corolla* with narrow cylindric tube; the limb with 5 small, ovate, valvate lobes. *Stamens* 5, inserted on the corolla-throat; filaments slender; anthers ovate. *Ovary* 2-celled; style filiform; stigma capitate; ovules numerous in each cell. *Capsule* oblong, septically 2-valved, carpophore finally free. *Seeds* numerous; testa lax, 4 to 6 times as long as the linear caudate nucleus; albumen fleshy; embryo straight or curved.—DISTRIB. Two species; both Malayan.

Flowers .25 in. long; capsules .15 in. long	..	..	1. <i>N. malaccensis</i> .
Flowers .35 in. long; capsules .25 in. long	..	..	2. <i>N. major</i> .

1. *NORRISIA MALACCENSIS*, Gardn. in Hook. Kew Journ. I. 327 (*in part*) (1849). A tree; young branches much thinner than a goosequill, terete, deciduously fulvous-puberulous and with many lenticels, dark brown when dry. *Leaves* thinly coriaceous; ovate or elliptic, acute at each end; upper surface brown, glabrous, shining; the lower rather pale olivaceous, glabrous except the deciduously puberulous midrib and nerves (uniformly puberulous in var.); main nerves 4 to 6 pairs, ascending, curved, prominent like the midrib on the lower surface, indistinct on the upper; length 1.5 to 2.5 in., breadth .85 to 1.25 in.; petiole .25 in. *Cymes* as in *N. major*, but smaller, and the flowers only .25 in. long, and the ripe capsules rather less than .15 in. long. Clarke in Hook. f. Fl. Br. Ind. IV. 85 (*in part*).

MALACCA: *Griffith* (K.D.) 3731 (*in part*); *Maingay* (K.D.) 1023; *Goodenough* 1382; *Derry* 1035.

VAR. *pubescens*, King & Gamble. Under surfaces of leaves uniformly pubescent.

PERAK: *Scortechini* 634; *King's Collector* 10535.

2. *NORRISIA MAJOR*, Solereder in Engl. & Prantl. Naturl. Pflanzenfam. IV. 2, 37 (1892). A tree; young branches thinner than a goosequill, terete, deciduously fulvous-puberulous, black when dry. *Leaves* thinly coriaceous; elliptic or oblong-elliptic, acute, the base cuneate; both surfaces olivaceous-brown when dry, the lower reticulate, both glabrous except the fulvous-puberulous midrib and nerves on the inner surface; main nerves 5 to 7 pairs, stout, oblique, little-curved, deciduously fulvous-puberulous like the midrib on the lower surface; length 2.75 to 3.25 in., breadth 1.5 to .25 in.; petiole .2 to .25 in. long. *Cymes* in dense, corymbose, terminal, pedunculate panicles, their branches fulvous-tomentose; bracts linear, about .2 in. long or less. *Flowers* sessile or subsessile, minutely bracteolate, .35 in. long. *Calyx* minute, cupular, 5-toothed. *Corolla* with a cylindric tube slightly dilated near the base, densely pubescent outside; the mouth with 5 linear-oblong, blunt, much recurved lobes, glabrous inside; filaments much exerted; anthers broadly ovate. *Capsule* .25 in. long and about .15 in. in diam., ellipsoid, pubescent. *Seeds* with a much elongate wing at each end. *N. malaccensis*, Gardn. in Hook. Kew Journ. Bot. I. 327; Clarke in Hook. f. Fl. Br. Ind. IV. 85 (*in part*). *Antonia Griffithii*, Wight Ill. II. t. 156B.

PERAK: *King's Collector* 7845, 10882. MALACCA: *Griffith*; *Maingay* (K.D.) 1024; *Ridley* 1382. SINGAPORE: *Ridley* 6828.

5. FAGRÆA, Thunb.

Trees or shrubs, often epiphytic, sometimes scandent. *Leaves* opposite, entire (crenulate in *F. crenulata*); petioles dilated at the base or united by a stipulary sheath. *Cymes* terminal or axillary, corymbose racemose or paniculate; bracts small. *Flowers* large or small, white or yellowish, rarely pink. *Calyx* deeply 5-fid; its lobes thick, broad, much imbricate. *Corolla-tube* narrow or funnel-shaped, sometimes much elongate; lobes of its limb broad, twisted to the left in bud. *Stamens* 5; anthers oblong, on slender filaments. *Ovary* 2-celled, or 1-celled above; style filiform; stigma capitate; ovules numerous in each cell. *Berry* 1- to 2-celled. *Seeds* numerous, immersed in pulp; testa crustaceous; albumen horny; embryo small, straight.—*DISTRIB.* About 50 species, in India, China, Japan, Malaya, Australia and the Pacific Islands.

Cymes few-flowered, solitary, sessile or nearly so:—

Flowers 3 to 6 in. long:—

Corolla salver-shaped, its tube narrowly cylindric, very little dilated at the throat:—

Tube of corolla nearly 3 in. long and only about .1 in. in diam.; limb less than 1 in. across .. .. 1. *F. tubulosa*.

Tube of corolla 4 in. long and .35 in. in diam.; limb more than 2 in. across .. .. 2. *F. carnosa*.

Corolla funnel-shaped from near the base:—

Corolla 5 or 6 in. long .. .. 3. *F. auriculata*.

Corolla 3.5 in. long .. .. 4. *F. Curtisii*.

Flowers 1.25 to 2.5 in. long:—

Limb of corolla 1.5 in. across; stamens only slightly exerted:—

Corolla-lobes oblong, blunt; fruit elliptic-ovoid; leaves 3.5 to 5 in. long and 1.5 to 2.25 in. broad .. .. 5. *F. obovata*.

Corolla-lobes rotund-oblong; fruit globose, crowned by the remains of a stout style; leaves 2.5 to 4.5 in. long and 1 to 1.75 in. broad .. .. 6. *F. lanceolata*.

Limb of corolla about .75 in. across; stamens much exerted .. .. 7. *F. Wallichiana*.

Cymes few-flowered but numerous, arranged in long, usually pedunculate, sometimes interrupted, terminal racemes:—

Flowers 2 in. long; corolla widely funnel-shaped; its limb 1.5 in. across .. .. 8. *F. Maingayi*.

Flowers 1 to 1.25 in. long; corolla widely funnel-shaped; the limb .75 to .9 in. across .. .. 9. *F. racemosa*.

Cyme solitary, on the apex of a short, slender, terminal or axillary peduncle; flowers 1.15 in. long; corolla narrowly funnel-shaped; its limb about .75 in. across .. .. 10. *F. ligustrina*.

Cymes spreading, corymbose, many-flowered:—

Flowers 1.5 to 2 in. long; stamens slightly exerted:—

Leaves crenulate, 7 to 12 in. long; flowers 1.5 in. long .. .. 11. *F. crenulata*.

Leaves entire, 5 to 9 in. long; flowers 2 in. long .. .. 12. *F. vaginata*.

Flowers .5 in. long; stamens much exerted .. .. 13. *F. fragrans*.

## SPECIES IMPERFECTLY KNOWN.

- Leaves broadly obovate, very coriaceous; fruit 2 in. or more in length, ovoid, apiculate .. .. 14. *F. Ridleyi*.  
 Leaves elliptic-oblong, thin when dry; fruit narrowly ovoid, tapered to the base, crowned by the remains of the thick style .. .. 15. *F. oblonga*.

1. *FAGRÆA TUBULOSA*, Blume Mus. Bot. Lugd.-Bat. I. 167 (1850). A straggling, glabrous, climbing shrub; branches half as thick as a goose-quill, terete, pale, sending out rootlets at intervals on the bark of trees. *Leaves* thinly coriaceous; oblong-elliptic, shortly abruptly acuminate, the base cuneate; both surfaces pale yellowish-green, and dull when dry; main nerves 5 or 6 pairs, inconspicuous on both surfaces; midrib conspicuous; length 4 to 8 in., breadth 1·75 to 2·5 in.; petiole ·8 to 1 in. long. *Flowers* about 3 in. long, sessile, 3 or 4 crowded in a sessile glomerulus at the apex of a branch, with a subcampanulate bract, ·15 in. long, at the base of each. *Calyx* ·4 in. long, fleshy, tubular; the mouth with 5 short, broad, imbricate teeth. *Corolla* 3 in. long, salver-shaped; the tube slender, cylindric, very slightly wider at the throat, ·1 in. in diam.; limb divided to its base into 5 oblong-oblancheolate lobes ·45 in. long. *Stamens* attached near the mouth of the tube and slightly exserted beyond it. *Ovary* narrowly ellipsoid, tapering into a glabrous style about as long as the corolla; stigma capitate. *Fruit* unknown. Miq. Fl. Ind. Bat. II. 373.

PERAK: *Scortechini* 1839; *King's Collector* 5748; at Bujong Malacca, *Ridley* 9738.—DISTRIB. Bangka, Sumatra.

2. *FAGRÆA CARNOSA*, Jack in Mal. Misc. II. n. 7, 81 (1822). Epiphytal, glabrous; young branches as thick as a swan's quill, smooth, pale brown when dry. *Leaves* coriaceous; elliptic, sometimes subobovate or subrotund, the apex rounded or subtruncate, mucronate; edges recurved; upper surface when dry somewhat olivaceous, the lower dull brown; main nerves invisible on either surface; midrib prominent on the lower, depressed on the upper surface; length 3 to 4·5 in.; breadth 2 to 2·5 in.; petiole ·4 to ·5 in. long, swollen at the base. *Flowers* fleshy, about 6 in. long, solitary or in pairs, terminal, with 2 or more short, woody, pointed bracteoles at their bases, sessile or subsessile. *Calyx* narrowly campanulate, nearly 1 in. long; its tube very short; the limb with 5 oblong, blunt, suberect lobes. *Corolla-tube* 4 in. long, cylindric, ·35 in. in diam. at the middle, slightly wider towards the mouth; limb campanulate, about 1·25 in. across, with 5 broadly oblong, blunt, spreading lobes. *Stamens* subsessile near the apex of the tube, included. *Style* slightly longer than the tube. *Fruit* the size of a small hen's egg, but narrower and more tapering to the apex. DC. Prodr. IX. 30; Benth. in Journ.



Linn. Soc. IX. 97; Miq. Fl. Ind. Bat. II. 374; Clarke in Hook. f. Fl. Br. Ind. IV. 82.

PERAK: *Scortechini*; Wray 2317; King's Collector 5349, 7296, 8452; Ridley 10297.—DISTRIB. Burma.

3. *FAGRÆA AURICULATA*, Jack in Mal. Misc. II. n. 7, 82 (1822). A glabrous shrub; young branches about .5 in. in diam., pale. *Leaves* thickly coriaceous; oblong-ob lanceolate or -obovate; apex subacute or acute, narrowed from about the middle to the stout petiole; both surfaces pale yellowish-brown when dry; main nerves 6 to 8 pairs, spreading, slightly curved, rather conspicuous on the lower surface, invisible on the upper; midrib broad, bold on both surfaces; length 6 to 12 in.; breadth 2.35 to 4 in.; petiole .5 to 1.25 in. long, with 2 rotund, reflexed, stipule-like auricles at the base, .5 to .75 in. across. *Flowers* thickly coriaceous in all their parts, 5 or 6 in. long, in terminal cymes of about 3; their pedicels about as thick as a goosequill, minutely adpressed, pubescent, .75 to 1.5 in. long, and bearing near the base of the flower one or two pairs of triangular, one-ribbed, appressed, large bracteoles. *Calyx* ellipsoid, nearly 2 in. long, deeply divided into 5 imbricate elliptic or oblong blunt lobes. *Corolla* with a cylindric tube about 1 in. long and .5 in. in diam. (when dry); the limb funnel-shaped, 3 to 4 in. long, with 5 deep, oblong, blunt lobes. *Stamens* 5, included; the filaments attached to the base of the limb by thickened bases; anthers .65 in. long, oblong, deeply bifid at the base the filaments attached by their attenuate apices at the upper end of the notch. *Ovary* narrowly ellipsoid, glabrous; style stout, 4 in. long; stigma peltate. *Fruit* narrowly ellipsoid, blunt, glabrous, 2.25 in. or more in length when dry. Wall. Cat. 1596; Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 34 and 573; Pl. As. Rar. III. 15, t. 229; Blume Bijdr. 1020, and Rumph. II. t. 72; DC. Prodr. IX. 29; Miq. Fl. Ind. Bat. II. 371; Clarke in Hook. f. Fl. Br. Ind. IV. 83. *F. auricularia*, Benth. in Journ. Linn. Soc. I. 98; Kurz For. Fl. II. 204. *F. imperialis*, Miq. in Ann. Mus. Bot. Lugd.-Bat. II. 226, t. 5. *Willughbeia auriculata*, Spreng. Syst. *cura post.* 71.

Common in all the Provinces.—DISTRIB. Malay Archipelago.

4. *FAGRÆA CURTISII*, King & Gamble, n. sp. A low spreading tree; young branches as thick as a swan's quill, grey, striate when dry. *Leaves* very coriaceous; elliptic or slightly obovate, the apex shortly and bluntly acuminate, the base cuneate; both surfaces glabrous, olivaceous when dry; the midrib prominent on the lower surface, faint on the upper, nerves obsolete in both; length 4 to 8.5 in., breadth 2.25 to 3 in.; petiole .5 to .75 in. long, stout, sheathing at the base. *Flowers* 3.5 in. long, terminal, in pairs; their pedicels stout, compressed, about .5 in. long, bearing

2 pairs of broadly ovate, acute, fleshy bracteoles. *Calyx* .7 to .9 in. long, very coriaceous, narrowly campanulate, cut one-third of the way down into 5 rounded lobes. *Corolla* thickly coriaceous, 3.25 in. long, funnel-shaped; tube 1.75 in. long, much widened towards the mouth; limb spreading, with 5 deep broadly elliptic lobes, with obtusely, minutely, and bluntly apiculate apices. *Stamens* slightly exserted; anthers oblong, blunt. *Fruit* unknown.

KEDAH: in Langkawi Island, *Curtis* 1676.

5. *FAGRÆA OBOVATA*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II., 33 (1824). Scandent, glabrous, epiphytic; young branches nearly as thick as a goosequill, brown when dry. *Leaves* coriaceous; oblong-oblancheolate to elliptic sometimes obovate, the apex abruptly and shortly acuminate or mucronate, the base cuneate; both surfaces brown when dry, the upper tinged olivaceous; main nerves almost invisible; midrib very prominent on the lower surface, less so on the upper; length 3.5 (rarely 2.5 in.) to 5 in., breadth 1.5 to 2.25 in. (rarely only 1 in.); petiole .6 to 1 in. long, swollen at the base. *Flowers* 2 to 2.25 in. long, sessile or on peduncles .3 in. long, in small terminal sessile cymes of 4 or 5; the cymes with 2 thick oblong bracts at their bases. *Calyx* .5 to .75 in. long, .4 in. wide, tubular with 2 thick triangular bracteoles at the base; lobes of limb ovate-elliptic or subrotund, obtuse. *Corolla* funnel-shaped, 1.8 to 2.15 in. long; the tube .75 in. long, narrowly cylindric below, wider upwards; limb 1.5 in. wide, deeply cut into 5 oblong, blunt, spreading lobes; filaments slender, attached near the apex of the tube, shorter than the corolla-lobes; anthers included, oblong, deeply cleft at the base. *Ovary* elliptic; style slightly shorter than the anthers; stigma capitate. *Fruit* elliptic-ovoid, smooth, shining, crowned by the short remains of the style, 1.5 in. long. Wall. Cat. 1595; Blume Bijdr. 1021, and Rumph. II. t. 75; DC. Prodr. IX. 29; Bot. Mag. t. 4205; Griff. Notul. IV. 35, and Ic. Pl. Ind. Or. t. 382; Miq. Fl. Ind. Bat. II. 369; Clarke in Hook. f. Fl. Br. Ind. IV. 83; Kurz For. Fl. II. 205. *F. crassifolia*, Blume Rumph. II. 78, fig. 1, and Mus. Bot. Lugd.-Bat. I. 166; Thwaites Enum. 200; Miq. l.c. 373; Wall. Cat. 1602. *F. malabarica* and *F. obovato-javana*, Blume Rumph. II. 29, t. 75, and Mus. Bot. l. c. 164; Wight Ic. 1317. *F. Blumei*, Steud.; DC. l.c. 30. *F. coromandeliana*, Wight Ic. 1316; Bedd. Fl. Sylv. t. 224. *F. celebica*, Blume Mus. Bot. l. c. 167. *F. globosa*, Wall. Cat. 1598; DC. l. c. 29. *Willughbeia obovata*, Spreng. Syst. curæ post. 71.

KEDAH: *Curtis*. PENANG: *Curtis* 246, 2432, 3013. PERAK: *Wray* 1139, 2115, 2248, 2426, 2714, 3075, 4181, 4269; *Scortechini* 202, 758; *King's Collector* 3122, 4024, 4878, 5748, 6214, 6438, 7553, 7578, 8855, 10109, 10634, 10776. MALACCA: *Griffith* (K.D.) 3737; *Maingay* (K.D.)

1028, 1030, 1031; Derry 1012. JOHORE: Ridley 6312—DISTRIB. Malay Archipelago, British India.

Following Mr. Clarke in Hooker's 'Flora of British India,' we have reduced to *F. obovata*, Wall., not only the forms which have received specific names as above quoted, but also those found in British India, there being no constant characters that we can discover to separate them. Some of the specimens from India have, however, longer flowers, and the main nerves of their leaves are more distinct than in the majority of Malayan specimens.

6. *FAGRÆA LANCEOLATA*, Blume Bijdr. 1021 (1826). Scandent, 30 to 40 ft. long, glabrous; young branches about as thick as a goosequill, the nodes close together, cinereous when dry. *Leaves* coriaceous; oblong-ob lanceolate, subacute, the base much narrowed; both surfaces very dark cinereous when dry; main nerves invisible; midrib bold on the lower surface, faint on the upper; length 2·5 to 4·5 in., breadth 1 to 1·75 in.; petiole ·35 to ·5 in. long. *Flowers* terminal, pedunculate, solitary or in pairs or in threes; their peduncles subclavate, about 3 in. long, hibracteolate at the apex, and sometimes with larger bracts at the base. *Calyx* 5 in. long, obconic, 5-lobed; the lobes coriaceous, fleshy below, rounded, with membranous margins. *Corolla* 3 in. long, funnel-shaped, the lobes of the limb spreading, oblong-rotund. *Stamens* 5, exserted. *Anthers* oblong, obtuse, dorsifixed; filaments slender. *Ovary* ovoid; style filiform. *Fruit* obovoid, globose, smooth, shining, nearly 1·5 in. in diam., crowned by a short stout fragment of the style; the calyx at its base with 5 subrotund lobes ·45 in. broad and with broad scarious edges. Blume Rumph. II. 31, t. 77, and Mus. Bot. Lugd.-Bat. I. 167; Miq. Fl. Ind. Bat. II. 376.

PERAK: Wray 3202; King's Collector 6848.—DISTRIB. Java.

7. *FAGRÆA WALLICHIANA*, Benth. in Journ. Linn. Soc. I. 98 (1857). A tree?; young branches half as thick as a goosequill, pale brown when dry, glabrous; the leaf-scars close together and prominent. *Leaves* coriaceous; narrowly elliptic or oblanceolate, apex acute or shortly acuminate, the base much narrowed and forming narrow wings to the petiole; both surfaces glabrous, the upper greenish when dry, the lower brown; main nerves 4 or 5 pairs, curving upwards and forming wide arches ·1 to ·15 in. from the edge, rather distinct on the lower surface when dry, invisible on the upper; midrib conspicuous on the lower surface; length 2·25 to 3 in., breadth ·6 to 1·1 in.; petiole ·3 to ·5 in. long, winged in its upper part. *Flowers* (excluding the stamens) 1 to 1·25 in. long, pedicellate, 3 to 5 together in pedunculate lax cymes from the apex and upper leaf-axils; bracteoles few, minute; peduncles about 1 in. long; pedicels about ·5 in. *Calyx* clavate, about 5 in. long; the teeth 5, minute. *Corolla* salver-shaped, 1 in. long; the tube cylindric, slender, becoming

wider towards the campanulate limb; limb .65 in. in diam., its 5 lobes oblong, obtuse, spreading. *Stamens* 5, their slender filaments inserted near the apex of the tube and exserted .75 in. beyond its lobes. *Anthers* (ovate?). *Ovary* narrowly ellipsoid, tapering to the filiform long-exserted style 2 to 2.5 in. long; stigma narrow. *Fruit* ellipsoid, slightly tapered each end, shining, .5 in. long. *F. lanceolata*, Wall. Cat. 1599 (not of Blume); Clarke in Hook. f. Fl. Br. Ind. IV. 85. *Cyrtophyllum ? lanceolatum*, DC. Prodr. IX. 31.

PENANG: *Curtis* 375. PERAK: *King's Collector* 4851. MALACCA: *Maingay* (K.D.) 1029.

8. *FAGRÆA MAINGAYI*, Clarke in Hook. f. Fl. Br. Ind. IV. 84 (1883). A glabrous tree, 40 to 50 ft. high; young branches as thick as a swan's quill. *Leaves* large, very coriaceous; oblong to elliptic-oblong, blunt, obtusely apiculate, the base rounded, the edges when dry recurved; upper surface pale or brownish-olivaceous, the lower brown when dry, both dull; main nerves 5 to 8 pairs, stout but faint on both surfaces; midrib stout on the lower surface, faint on the upper; length 7 to 10 in., breadth 2.75 to 4 in.; petiole .5 to .9 in. long, stout, slightly dilated at the base. *Cymes* few-flowered, subsessile, mixed with some solitary flowers in a terminal, elongate, pedunculate raceme, with a rachis as thick as a goose-quill and 3 to 6 in. long; its peduncle 2 to 3 in. long. *Flowers* 2 in. long, solitary or in shortly pedunculate cymes of 2 or 3; pedicels .5 in. long, with 2 pairs of broadly ovate-acute bracteoles at their bases. *Calyx* subglobular or ellipsoid, about .5 in. long, cleft nearly to the base into 5 rotund-ovate lobes with scarious margins. *Corolla* funnel-shaped, 1.75 in. long; the tube .2 in. in diam. at the base, but gradually expanding upwards; the limb 1.5 in. wide, its lobes 5, broad, blunt. *Stamens* 5, included. *Ovary* narrowly ellipsoid, much attenuate upwards; style slender; stigma turbinate, lobed, included. *Fruit* unknown.

PERAK: *King's Collector* 8671. MALACCA: *Maingay* (K.D.) 1033; *Derry* 573.

9. *FAGRÆA RACEMOSA*, Jack in Roxb. Fl. Ind. ed. Carey & Wall. II. 35 (1824). A glabrous bush or small tree, 12 to 25 ft. high; young branches from half as thick to as thick as a goosequill, pale when dry, and sometimes angled. *Leaves* large, coriaceous; elliptic or oblong-elliptic to elliptic-rotund, apex blunt but terminated by a short abrupt acute apiculus less than .5 in. long, base cuneate or rounded; both surfaces yellowish-olivaceous when dry, the lower paler; main nerves 5 to 7 pairs, spreading, curving upwards and interarching, .1 to .25 in. from the edge; midrib very prominent on the lower surface, less so on the upper; length 5 to 10 in., breadth 3 to 6 in.; petiole .4 to .8 in. long expanded at



the base. *Flowers* fleshy, 1 to 1·25 in. long, on thick pedicels arranged in small sessile cymelets crowded in a terminal, pedunculate, sometimes interrupted, raceme, from 1·5 to 6 in. long; peduncle of the raceme 1·5 to 4 in. long; pedicels of the individual flowers ·2 to ·25 in. long, bearing at their bases several broad, short, bracteoles. *Calyx* obovoid, ·25 to ·35 in. long, cleft half-way into 5 broad subrotund lobes. *Corolla* ·85 in. to 1 in. long, widely funnel-shaped; the limb ·75 to ·9 in. across, divided into 5 blunt oblong spreading lobes ·25 in. long; tube only ·2 to ·3 in. long, abruptly expanding at the throat. *Stamens* 5, included; the filaments slender. *Anthers* broadly elliptic, marginate, deeply cleft at the base. *Ovary* narrowly elliptic; style much thicker than and about as long as the filaments; stigma capitate. *Fruit* ellipsoid, smooth, ·5 in. long. DC. Prodr. IX. 29; Benth. in Journ. Linn. Soc. I. 99; Kurz For. Fl. II. 205; Benth. Fl. Austral. IV. 367; Clarke in Hook. f. Fl. Br. Ind. IV. 84. *F. coarctata*, Blume Rumph. II. 33, and Mus. Bot. Lugd.-Bat. I. 170. *F. volubilis*, Jack in Roxb. l.c. 36; DC. l.c. 30; Miq. Fl. Ind. Bat. II. 367. *F. morindæfolia*, Blume Rumph. II. 32, t. 73, fig. 2, and t. 79, and Mus. Bot. l.c. 169; DC. l.c. 29; Clarke l.c. *F. appendiculata*, *F. cuspidata*, *F. robusta*, Blume Mus. Bot. l.c. 169, 170. *F. Thwaitesii*, F. Muell. Fragm. Phyt. Austral. II. 137. *Kuhlia morindæfolia*, Reinw. in Blume Bijdr. 777. *Kentia morindæfolia*, Steud. Nomencl. Bot. ed. 2, I. 845. *Utania morindæfolia*, G. Don Gen. Hist. Dichl. Pl. IV. 663. *Willughbeia racemosa*, Spreng. Syst. curæ post. 71.

In all the provinces: very common.—DISTRIB. Malayan Archipelago, Burma.

VAR. *pauciflora*, King & Gamble. *Leaves* thinly coriaceous; raceme lax, its rachis slender. *Flowers* solitary or in 2- to 3-flowered cymes, not crowded.

PERAK: Wray 1960; King's Collector 707, 1926, 3016, 3242; Scortechini 112. SINGAPORE: Ridley 6315, 8917.—DISTRIB. Sumatra (Forbes 1927), Java.

10. *FAGRÆA LIGUSTRINA*, Blume Rumph. II. 33 (1836). A shrub, all parts glabrous; young branches twice as thick as a crowquill, terete, pale yellowish-brown when dry. *Leaves* coriaceous; elliptic to elliptic-oblong, apex shortly and rather bluntly acuminate, base cuneate; both surfaces pale yellowish-brown when dry; main nerves about 4 pairs, spreading at first, then ascending to form wide arches ·15 to ·2 in. from the edge, slightly conspicuous on the lower surface, very faint on the upper; midrib stout on the lower surface, slightly channelled on the upper; length 3 to 3·75 in., breadth 1 to 2 in.; petiole ·25 to 3 in. long. *Flowers* 1·15 in. long, on thick pedicels less than ·1 in. long, 5 to 10 together in simple or shortly branched terminal or axillary

pedunculate cymes. *Calyx* fleshy, .15 in. long, pyriform; the mouth with 5 shallow very broad imbricate lobes faintly ciliate at the apex. *Corolla* slightly exceeding 1 in. in length; the tube narrowly cylindric below, expanding upwards into the narrowly campanulate broadly 5-lobed limb .75 in. wide. *Stamens* 5, slightly exserted; filaments inserted at the base of the limb, broad, membranous at the edges. *Anthers* narrowly oblong, blunt, the base deeply auriculate. *Ovary* narrowly ellipsoid, tapering into a style as long as the stamens; stigma narrow. *Fruit* clavate, apiculate, smooth, .6 in. long (unripe). Blume Mus. Bot. Lugd.-Bat. I. 171; Benth. in Journ. Linn. Soc. I. 100; Clarke in Hook. f. Fl. Br. Ind. IV. 85.

SINGAPORE: *Ridley* 1650, 2783, 8453; *Lobb*.

11. *FAGRÆA CRENULATA*, Maing. ex Clarke in Hook. f. Fl. Br. Ind. IV. 83 (1883). A tree (or a climber?), all parts glabrous; young branches .75 in. thick, the older with prominent leaf-scars close together, yellowish-brown. *Leaves* coriaceous; broadly obovate-rotund, with no petiole, but abruptly narrowed above the base and embracing the branch; both surfaces dark brown when dry; the edges minutely crenate; main nerves 4 or 5 pairs, spreading, prominent on the lower surface, slightly depressed on the upper; length 7 to 12 in., breadth 5.5 to 8 in. at the broadest part, but 1 in. or less at the contracted part above the attachment to the branch. *Flowers* coriaceous, 1.5 in. long, on short thick pedicels or sessile, arranged in terminal pedunculate compound trichotomous cymes with divaricating 4-angled branches; peduncle of cyme compressed, 1 to 3 in. long, with 2 spreading thick concave bracts at its apex. *Calyx* .35 in. long, campanulate, cut half-way down into 5 unequal broad blunt suberect lobes. *Corolla* 1.25 in. long, clavate in bud, funnel-shaped; the tube narrowly cylindric, .2 in. long; the limb funnel-shaped, cut a quarter of its length into 5 blunt lobes. *Stamens* 5, included; filaments attached to the mouth of the tube; anthers oblong, deeply bifid at the base, the cells parallel. *Ovary* glabrous, ellipsoid-conic, tapering into the thin exserted style; stigma obconic. *Fruit* ellipsoid (unripe .75 in. long).

KLANG: *Ridley* 9552. PERAK: *Scortechini* 1642. MALACCA: *Main-gay* (K.D.) 1032; *Ridley* 1284. SELANGOR: *Ridley* 7552.

12. *FAGRÆA VAGINATA*, King & Gamble, n. sp. A large glabrous shrub or small tree, sometimes apparently a climber; young branches from .25 to .35 in. in diam., yellowish-cinereous when dry and somewhat 4-angled. *Leaves* thickly coriaceous; elliptic to obovate-elliptic, blunt or slightly apiculate, much narrowed at the base; upper surface olivaceous, the lower brown when dry; main nerves 5 or 6 pairs, curved, spreading, very prominent on the lower surface, faint on the upper;

midrib very stout on the lower surface, much more slender on the upper; length 5 to 9 in., breadth 2.75 to 4 in.; petiole about 1 in. long, expanding into a sheath at the base. *Flowers* 2 in. long, collected in lax terminal cymose corymbs, 4 in. long, and about as much in breadth; the branches 1.25 to 1.75 in. long, each bearing an umbellate 3-flowered cyme; lower bracts linear-oblong, blunt, 1 in. long, the upper only .15 in. long; pedicels about .5 in. long, bibracteolate at the apex. *Calyx* .8 or .9 in. long, narrowly tubular in its lower part, the upper much wider; the mouth with 5 broad, blunt, erect lobes, .2 in. long. *Corolla* 1.5 in. long; its tube .5 in. long; the limb widely funnel-shaped, with .5 broad, blunt, spreading lobes. *Stamens* 5; filaments attached to the mouth of the tube, shorter than the corolla-limb, attached to the oblong anthers at the apex of their deep basal notch; anthers .2 in. long. *Ovary* ovoid, apiculate; style much shorter than the corolla; stigma conical. *Fruit* ovoid-conic, crowned by the short style, glabrous, shining, 1.75 in. long.

PERAK: *Wray* 1084, 1992; *King's Collector* 3868, 4041, 4238, 6605, 10124; *Scortechini* 817. SELANGOR: *Ridley* 7607. — *DISTRIB.* Java, *Anderson* 289; *Forbes* 827.

Named from its sheathing petioles; allied to *F. obovata*, Wall.

13. *FAGRÆA FRAGRANS*, Roxb. Fl. Ind. ed. Carey & Wall. II. 32 (1824). A tree, 100 to 150 ft. high, all parts glabrous; young branches much thinner than a goose-quill, shining, yellowish-brown when dry, the nodes close together. *Leaves* thinly coriaceous, small: oblanceolate to elliptic, the apex shortly and abruptly acuminate, the base much narrowed; the edges (when dry) slightly waved and recurved; both surfaces olivaceous-brown when dry, the lower the darker, subglandular; main nerves 5 to 8 pairs, subhorizontal, faint on both surfaces; midrib prominent on both, but especially on the lower surface; length 2.25 to 4 in.; petiole .3 to .6 in. long. *Cymes* axillary or terminal, much branched, pedunculate, corymbose, 20- to 30-flowered. *Flowers* .5 in. long (excluding the much exserted stamens and style). *Calyx* under .1 in. length, campanulate, with 5 rounded lobes. *Corolla* salver-shaped, .5 in. long, its tube narrow; limb with 5 somewhat unequal, oblong, blunt, spreading lobes. *Stamens* exserted for more than .5 in.; anthers elliptic; filaments slender. *Ovary* ovoid, glabrous; style longer than the stamens. *Fruit* subglobose, reddish, .3 in. in diam. Roxb. Fl. Ind. I. 461; Wall. Cat. 1597; Miq. Fl. Ind. Bat. II. 375; Kurz For. Fl. II. 205; Clarke in Hook. f. Fl. Br. Ind. IV. 85. *F. peregrina*, Blume Rumph. II. t. 80; Field. and Gardn. Sert. t. 6. *Cyrtophyllum fragrans*, DC. Prodr. IX. 31. *C. peregrinum*, Reinw.; Blume Bijdr. 1022; DC. l. c.

PENANG: *Curtis* 314. PERAK: *Low* 130; *Scortechini* 993, 2045; *King's Collector* 6073, 6175. MALACCA: *Maingay* (K.D.) 1026; *Griffith* (K.D.) 3735; *Derry* 53, 272. SINGAPORE: *Schomburgk* 38; *Ridley* 8921; *G. King*.—DISTRIB. Malay Archipelago.

## SPECIES IMPERFECTLY KNOWN.

14. *FAGRÆA RIDLEYI*, King & Gamble, n. sp. Epiphytal, quite glabrous; young branches as thick or nearly twice as thick as a swan's quill, brown when dry. *Leaves* thickly coriaceous; obovate, the apex broad and rounded, much tapered to the base; both surfaces pale yellowish-brown when dry; main nerves 5 pairs, ascending, rather straight, very stout and prominent on the lower surface like the broad midrib; length 5 to 9 in., breadth 3·5 to 6 in.; petiole 1 to 1·5 in. long, very stout, expanded at the base. *Flowers* unknown. *Fruit* 2 in. or more in length and 1·25 in. in diam. (when dry), in terminal cymes, ovoid, apiculate, shining; the calyx at its base 1 in. long, campanulate, with 5 broad rotund lobes, coriaceous.

MALACCA: on Mount Ophir, *Ridley*, 3785. SINGAPORE: *Ridley* 2767, 5845, 11363.

15. *FAGRÆA OBLONGA*, King & Gamble, n. sp. A small tree (or epiphyte?); young branches about as thick as a goose-quill, the internodes short; when dry brownish and shining. *Leaves* thinly coriaceous; elliptic-oblong, the apex shortly and rather abruptly acuminate, the base cuneate; edge slightly reflexed; both surfaces shining when dry, pale, the upper olivaceous, the lower tinged with yellow; midrib prominent on both, but especially on the lower surface; main nerves invisible; length 5 to 11 in., breadth 1·75 to 2·75 in.; petiole ·75 to 1·5 in. long. *Flowers* unknown. *Fruit* narrowly ovoid, tapered to the base, shining, crowned by the remains of the thick style, 2 in. long and about 1·25 in. in diam.

PERAK: at elevations of about 3500 ft., *Scortechini*; *King's Collector* 5430, 8445; *Wray* 2992; *Ridley* 5558.

6. *STRYCHNOS*, Linn.

Trees or scandent shrubs, usually with short, axillary, clavate tendrils. *Leaves* opposite, with 3 to 5 or more ribs starting at or a little above the base; other nerves less conspicuous. *Flowers* usually white or yellowish, in terminal or axillary, usually corymbosely paniculate, cymes; bracts and bracteoles small. *Calyx* small, 5- or 4-partite. *Corolla* hypocrateriform or campanulate; lobes 5 or 4, valvate. *Stamens* 5 or 4, inserted at the throat of the corolla-tube or below it; filaments short, filiform; anthers ovate or oblong, with distinct parallel cells.



*Ovary* 2-celled (or 1-celled in the upper part); ovules many in each cell; style long or short; stigma capitate or obscurely 2-lobed. *Fruit* a berry, usually globose, indehiscent, with a hardened pericarp. *Seeds* many, or by abortion 1 to 2 only, immersed in pulp, variously compressed, or if solitary globose; the hilum ventral; albumen usually copious, generally horny; embryo short, with flattened, foliaceous cotyledons and short terete radicle.—*DISTRIB.* Tropical and subtropical regions of both hemispheres; species about 100.

In describing the characteristic leaves of this genus, we have distinguished between the prominent “ribs” and the less conspicuous “nerves.”

Corolla-tube shorter than the lobes; berry usually small; seeds very few:—

Corolla-tube scarcely any, at most .025 in. long, tawny-villous within; leaves elliptic .. .. . 1. *S. Maingayi*.

Corolla-tube about .05 to .1 in. long:—

Corolla-lobes about .15 to .2 in.; stamens glabrous, inserted at the top of the tube; leaves ovate .. .. . 2. *S. Curtisi*.

Corolla-lobes about .075 in.; stamens villous, inserted at the middle of the tube; leaves elliptic-ovate or -oblong .. .. . 3. *S. laurina*.

Corolla-tube equal to or nearly equal to the lobes; berry small; seeds few:—

Corolla-tube and lobes together less than .125 in. long; leaves chartaceous; ovary rounded, glabrous:—

Corolla-tube and lobes glabrous on both sides; stamens inserted a little above the base of the tube; leaves glabrous, brown when dry .. .. . 4. *S. ovalifolia*.

Corolla-tube and lobes sparsely villous without, tube glabrous and lobes slightly villous within; stamens inserted at the throat of the tube; leaves glabrous, yellowish-green when dry .. .. . 5. *S. flavescens*.

Corolla-tube and lobes glabrous on both sides, but lobes within with a dense tuft of bristles at the base; stamens inserted at about two-thirds of tube; leaves softly pubescent .. .. . 6. *S. rufa*.

Corolla-tube and lobes .125 to .25 in. long; leaves more or less coriaceous:—

Stamens inserted at the top of the tube:—

Ovary glabrous; corolla-lobes within furnished with a dense tuft of bristles at the base; leaves 3- to 5-ribbed .. .. . 7. *S. malaccensis*.

Ovary villous; corolla-lobes within villous-tufted; leaves 5- to 7-ribbed .. .. . 8. *S. septemneris*.

Stamens inserted at the middle of the tube:—

Lobes of corolla glabrous within behind a dense tuft of bristles; leaves usually 5-ribbed, more or less pubescent .. .. . 9. *S. pubescens*.

Lobes of corolla villous within behind a dense tuft of bristles; leaves 3-ribbed, nearly or quite glabrous .. .. . 10. *S. Ridleyi*.

Corolla-tube much longer than the lobes :—

Corolla-tube nearly .25 in. long ; lobes .1 in. long ; stamens  
inserted at top of tube ; berry large, many-seeded ; leaves

glabrous, rather small    ..    ..    ..    .. 11. *S. Tieuté*.

1. *STRYCHNOS MAINGAYI*, Clarke in Hook. f. Fl. Br. Ind. IV. 88 (1883). A stout climbing shrub ; branches rough, brown ; branchlets somewhat angular, nearly black, densely studded with white prominent lenticels ; nodes swollen and marked by a prominent raised ring ; tendrils puberulous, in pairs, about 1 in. long, circinate, thickened upwards, supported by 2 small acute stipules on a .5 to 1 in. long stalk, each pair replacing a leaf near the ends of the branchlets. *Leaves* coriaceous ; elliptic, acuminate at apex, rounded at base ; glabrous on both surfaces, olivaceous-brown when dry ; 3 to 6 in. long, 1.25 to 3 in. broad ; 3- to 5-ribbed ; midrib stout, pale beneath and much raised, impressed above ; inner pair of side ribs from close above the base, curved upwards, parallel to the margin and looped in the upper half ; outside of them and close to the margin a second pair, more or less inconspicuous, also intramarginal and looped ; main nerves 6 to 8 pairs, commencing from the midrib about half-way up, very rarely opposite, straight or nearly so to join the principal pair of ribs at the loop sinuses ; secondary nerves few, branching ; reticulations irregular, prominent ; petiole .15 to .25 in. long, channelled above. *Cymes* axillary, sessile, paniculate, reaching 4 in. in length, much branched, the branches short, the rachis angular, pubescent ; bracteoles ovate-acute, ciliate, .05 to .1 in. long ; flowers extremely numerous, very small ; buds obovoid, rounded at tip. *Calyx* very small ; tube short ; lobes spreading, ovate-acute, ciliate, .03 in. long. *Corolla*-tube very short, about .025 in. long, glabrous without, long tawny-villous within ; lobes linear-oblong, .1 to .125 in. long, reflexed in flower. *Stamens* inserted near top of tube, nearly as long as corolla-lobes ; filaments slender, villous ; anthers .04 to .05 in. long, ovate, densely long-villous-hairy. *Ovary* rounded, glabrous ; style slender ; stigma capitate. *Berry* globose, about .5 to 1 in. in diam. ; endocarp smooth, black when dry. *Seeds* few, flattened, orbicular, .5 in. in diam. ; testa coriaceous ; cotyledons cordate, 3- to 5-nerved ; radicle short, stout.

PENANG : *Curtis* 3667. PERAK : *Scortechini* 1026 ; *Wray* 2009, 3112, 4279 ; *King's Collector* 6291, 8190. MALACCA : *Maingay* (K.D.) 1041, 1042. SINGAPORE : *Ridley* 5045.

2. *STRYCHNOS CURTISII*, King & Gamble, n. sp. A large climbing shrub, the stems reaching 6 in. in diam. ; branchlets pale brown, dull, somewhat angular, dotted with prominent white lenticels which are often elongate, uppermost pubescent ; nodes swollen and with a pale

pubescent ring; tendrils none (or not known!). *Leaves* coriaceous; ovate or ovate-oblong, rounded or slightly acute or shortly acuminate at apex, rounded or truncate or almost cordate at base; glabrous on both surfaces and olivaceous-brown when dry; 2·5 to 4 in. long, 1·5 to 2 in. broad; 3- to 5-ribbed; midrib stout, faintly impressed above, raised beneath; inner pair of ribs from about 1·5 in. above the base, conspicuous, gradually curved to the apex, the upper one-half to one-third only looped; outer pair faint, intramarginal, looped and joined to the inner by cross nerves; main nerves about 6 pairs, arched; secondary nerves many, similar to but fainter than main nerves; reticulations irregular; petiole 3 to 5 in. long, black when dry, puberulous. *Cymes* axillary, sessile, corymbose, many-flowered, 3-chotomous, sparsely pubescent, reaching 2 to 2·5 in. in length and about 1·5 in. in breadth; rachises somewhat angled; primary branches 5 to 75 in. long, successive ones shorter; pedicels 0·5 in. long; bracts lanceolate-acuminate, tawny-pubescent, 1 to 1·5 in. long, each pair clasping the rachis; bracteoles minute, pubescent, usually 1 or 2 to each pedicel; buds oblong, 15 in. long, ribbed, puberulous; flowers pale green with a yellowish centre. *Calyx* small, pubescent; tube short; lobes rounded, ciliate, 0·5 in. long. *Corolla*-tube 0·6 in. long, one-third of the length of the lobes (18 in.), glabrous within; lobes oblong-spathulate, thick, densely tawny-villous inside. *Stamens* inserted on the top of the tube; filaments slender, glabrous, 1 in. long; anthers oblong, obtuse, not villous. *Ovary* rounded, pubescent; style slender, pubescent, 1 to 1·25 in. long; stigma capitate, often bifid. *Berry* not known.

PENANG: on Government Hill, *Curtis* 2973. PERAK: Gunong Bubu, at 1500 to 2000 ft., *King's Collector* 7702; Ulu Bubong, *King's Collector* 10281, 10438.

3. *STRYCHNOS LAURINA*, Wall. Cat. 1591 (1828). A stout climbing shrub; branches somewhat angular, with pale yellowish-brown shining bark; lenticels pale, often elongate; nodes swollen; tendrils puberulous at tip only, in pairs, about 1 to 1·5 in. long, circinate, thickened upwards, supported by 2 small acute stipules, on a 75 in. long stalk, each pair replacing a leaf near the ends of the branchlets. *Leaves* subcoriaceous, elliptic-ovate or -oblong, acuminate at apex, rounded at base; glabrous on both surfaces; 3 to 6 in. long, 1·25 to 2·5 in. broad; 3-ribbed from a little above the base; midrib stout, pale beneath and raised, impressed above, as are the 2 inner ribs, which curve somewhat acutely upwards to the apex, not or only slightly looped above half-way up; outside them and close to the margin another pair more or less inconspicuous, making an intramarginal looped nerve; main nerves faint, 6 to 8 pairs, rarely opposite, straight from the midrib to join the

principal pair of ribs at the loop sinuses; secondary nerves few, branching; reticulations many, in an elegant network, inconspicuous; petiole .2 to .3 in. long, channelled above. *Cymes* pubescent, in rather short axillary sessile corymbs, or in elongate terminal panicles reaching 5 in. in length; rachises angular; bracteoles ovate-acute, ciliate; flowers very numerous, the buds obovoid. *Calyx* very small; tube short; lobes ovate-obtuse, ciliate, .03 to .05 in. long. *Corolla*-tube .075 in. long, glabrous without and at the base within, upper part within and lobes densely long tawny-villous; lobes .075 to .1 in. long. *Stamens* inserted at the middle of the tube; filaments slender, villous, .05 in. long; anthers as long, sparsely retrorse-villous at the base. *Ovary* rounded, villous, tapering into a conical style; stigma capitate. *Berry* globose, .5 to 1 in. in diam.; endocarp slightly rough and spotted. *Seeds* 1 to 2, orbicular, flattened on one surface, convex on the other; testa coriaceous. A. DC. Prodr. IX. 13; Benth. in Journ. Linn. Soc. I. 102; Kurz For. Fl. II. 166; Clarke in Hook. f. Fl. Br. Ind. IV. 88 (*excl. var.*).

MALACCA: *Maingay* (K.D.) 1035. PAHANG: *Ridley* 2161.—DISTRIB. India (Cachar, Burma, *Griffith* 3727, 3729).

*Wray* 1236 from "lower camp, Gunong Batu Pateh," Perak, is also probably this species, but the leaves are rather thinner and more lanceolate. So, too, probably, are *Scortechini* 295 and *King's Collector* 7193, which have very quadrangular branchlets and large leaves; but the specimens are too incomplete for certainty.

4. *STRYCHNOS OVALIFOLIA*, Wall. Cat. 1592 (1828). A large climbing shrub; branchlets slender, terete, with dark brown shining bark; lenticels few; nodes swollen and with a faint raised line; tendrils none (or not known!). *Leaves* chartaceous; ovate-lanceolate or -elliptic, acuminate at apex, cuneate at base; glabrous on both surfaces, 3 to 5 in. long, 1.5 to 2.5 in. broad, brown when dry; 3- to 5-ribbed; midrib rather slender, slightly impressed above, raised beneath, as are the 2 inner ribs which start from .2 to .4 in. above the base and are curved acutely upwards to the apex, looped only in the upper half; outside them and close to the margin another pair more or less conspicuous, with a marginal looped nerve; main nerves 4 to 5 pairs, faint, straight from the midrib to join the principal pair at the loop sinuses; secondary nerves many; reticulations irregular, fairly prominent; petiole slender, .25 to .5 in. long. *Cymes* axillary, paniculate, reaching about 2 in. in length, few-flowered; rachis angular, pubescent; bracteoles ovate-acute, ciliate; buds obovoid, short. *Calyx* very small; lobes ovate-obtuse, pubescent, ciliate, .05 in. long. *Corolla*-tube .06 in. long, glabrous, as are the lobes on both sides; lobes as long as tube. *Stamens* inserted a little above the base of the tube; filaments slender; anthers elongate, apiculate. *Ovary* rounded, glabrous, gradually contracted into the slender style; stigma



capitate. *Berry* globose, about .75 in. in diam.; endocarp thin, smooth. *Seeds* 1 to 3, oblong-orbicular, .8 by .5 in., flat, the margin undulate; testa crustaceous; cotyledons cordate. A. DC. Prodr. IX. 13; Benth. in Journ. Linn. Soc. I. 103. *S. laurina*, Wall., Clarke in Hook. f. Fl. Br. Ind. IV. 88 (*partly*).

PENANG: *Wallich* 1592; *Curtis* 3044, 3468. PERAK: *King's Collector* 4865. MALACCA: *Maingay* (K.D.) 1037.

5. *STRYCHNOS FLAVESCENS*, King & Gamble, n. sp. A large climbing shrub; branchlets slender, stiff, somewhat angular, with pale grey bark; nodes swollen; tendrils none (or not known). *Leaves* chartaceous; elliptic or elliptic-lanceolate, acute or acuminate at apex, attenuate or occasionally truncate or cordate at base; both surfaces glabrous, light yellowish green; 3 to 5 in. long, 1.5 to 2.75 in. broad; 3- to 5-ribbed from close above the base; midrib strong, somewhat impressed above, as is the inner pair of ribs which start at an angle of about 30° and curve upwards to the apex, faintly looped only near the top; outer pair of ribs quite inconspicuous, close to the margin and regularly looped; main nerves many, irregular, arched, only from 3 to 6 pairs joining the sinuses of the loops of the inner pair of ribs to the midrib; secondary nerves many; reticulations in an elegant network; petiole .3 in. long, channelled above. *Cymes* terminal, corymbose, minutely yellow-puberulous, reaching 4 in. in length and diam.; peduncle about 1 in. long; rachis angular; bracts linear or lanceolate, often leafy; bracteoles ovate-acute, enclosing the very short pedicels; buds globose; flowers minute, pale green. *Calyx* campanulate; tube short; lobes rounded, ciliate, .05 in. long, glabrous within. *Corolla*-tube cylindric, .05 in. long, glabrous within; lobes 4 or 5, as long as tube, sparsely villous without, more thickly so within. *Stamens* inserted on the throat of the tube; filaments extremely short; anthers ovate-acute, not villous, .025 in. long. *Ovary* globose, glabrous; style very short; stigma punctate. *Berry* obovoid, about 1 in. long, .5 in. in diam.; pericarp very thin, greenish, smooth. *Seeds* 2, inner face flattened, outer convex; .6 in. long, .5 in. broad.

PENANG: at Waterfall, *Curtis* 3430, 3667. PERAK: at Larut, *Scortechini* 1498; *King's Collector* 4998. MALACCA: at Ayer Panas, *Curtis* 3490.

6. *STRYCHNOS RUFA*, Clarke in Hook. f. Fl. Br. Ind. IV. 89 (1883). A climbing (?) shrub; branches pale brown, smooth, lenticellate; branchlets slender, patently rufous-pubescent, slightly angular; nodes somewhat swollen; tendrils none (so far as known). *Leaves* chartaceous; elliptic or elliptic-ovate, acute at apex, cuneate or rounded or subcordate at base; upper surface sparsely pubescent or glabrate, lower surface softly rufous-pubescent; 2.5 to 4.5 in. long, 1.5 to 2 in. broad; 3- to 5-ribbed; midrib rather

stout; inner pair of ribs more slender from a short distance only above the base, at about  $40^\circ$  with the midrib, slightly looped above; outer pair inconspicuous, much looped; main nerves 3 to 4 pairs, joining the midrib and side nerves and nearly straight; secondary nerves many, arched; reticulations fairly conspicuous; petiole .15 in. long. *Cymes* small, axillary, scarcely reaching .5 in. long, .75 in. broad; sessile, rufous-pubescent; branches trichotomous; pedicels slender, .1 in. long; bracteoles linear, small; buds small, oblong. *Calyx* very small; lobes ovate, acute, .05 in. long. *Corolla*-tube campanulate, .06 in. long, glabrous within, puberulous without; lobes a little shorter than tube, also glabrous within, but with a thick white tuft of bristly hairs at the base of each. *Stamens* inserted at about two-thirds of the height of the tube; filaments very short; anthers ovate, apiculate, retrorsely villous-hairy below. *Ovary* globose, glabrous; style very short; stigma capitate. *Berry* globose or oblong, .5 to 1.25 in. in diam., few-seeded; pericarp thick. *Seeds* ovate-oblong, compressed, .75 in. long by .5 in. broad; albumen thin.

PERAK: at Tapa and Relan Tujor, Wray 1334, 4033; at Campar, Ridley 9698; King's Collector 3973, 6199, 10187. MALACCA: Maingay (K.D.) 1034. SELANGOR: at Kwala Lumpor, Curtis 2398.

We have felt a little doubt about this species, which is merely represented by one fruiting specimen in the Kew Herbarium; but believe the identifications to be correct. The flowers are described from Curtis's specimen, the fruits from Maingay's and Wray's 1334.

7. *STRYCHNOS MALACCENSIS*, Benth. in Journ. Linn. Soc. I. 101 (1857). A climbing shrub; branchlets dark brown, terete, puberulous; nodes slightly swollen; tendrils pubescent, single or in pairs, reaching 1 to 2 in. in length, circinate, thickened upwards but again reduced at the tip, each replacing a leaf at the ends of the branchlets. *Leaves* subcoriaceous; ovate or elliptic-ovate, acute at apex, cuneate to rounded at base; glabrous on both surfaces, except in young leaves and on the midrib beneath; 2 to 4 in. long, 1.5 to 2 in. broad; 3- to 5-ribbed; midrib slender, impressed above; inner pair of ribs from about .5 in. above the base, starting at an angle of about  $30^\circ$  with the midrib, curving upwards to the apex, looped in the upper third; outer pair intramarginal, slender, looped; main nerves about 5 pairs, straight from the midrib to the inner ribs; reticulations many, in an elegant network; petiole .2 to .3 in. long, slender. *Cymes* axillary, corymbose, reaching 1 in. long and broad, fulvous-pubescent; peduncles .3 in. long; bracteoles very small; pedicels slender; flowers small, greyish-white; buds obovoid. *Calyx* very small; tube short; lobes ovate, acute, ciliate, puberulous, .05 in. long. *Corolla*-tube campanulate, .06 to .07 in. long, minutely

pubescent in the upper part within or nearly glabrous, puberulous without; lobes as long as or a little shorter than tube, with a dense tuft of pale bristles at the base within, otherwise glabrous. *Stamens* inserted at the top of the tube; filaments very short; anthers ovoid, .03 in. long, densely hairy, especially with retrorse hairs at the base. *Ovary* conoidal, glabrous, gradually attenuated into a rather thick style .05 in. long; stigma capitate. *Berry* ovoid, 1 in. long by .75 in. in diam.; pericarp of two layers, outer pergamaceous, shining, thin, inner hard, woody. *Seed* 1, oblong; albumen horny, copious; cotyledons ovate-acute, strongly nerved, .1 in. long; radicle thick. Miq. Fl. Ind. Bat. II. 379, 1080; Clarke in Hook. f. Fl. Br. Ind. IV. 89. *S. Gauthierana*, Pierre MS. in Herb. Kew.

PENANG: *Curtis* 1515; *King's Collector* 1539. MALACCA: *Griffith* (K.D.) 3724.—DISTRIB. Burma (Tenasserim or Andamans, *Helper* 3724; *Tavoy*, *Shaikh Mokim* 336), Cambodia.

8. *STRYCHNOS SEPTEMNERVIS*, Clarke in Hook. f. Fl. Br. Ind. IV. 88 (1883). A climbing shrub; branches stout, obscurely angled, pale brown, sparsely lenticellate, swollen at the nodes and prominently ringed; tendrils none (or not known!). *Leaves* coriaceous; elliptic, shortly acuminate at apex, attenuate at base, glabrous on both surfaces; 2.5 to 4.5 in. long, 1.5 to 2.5 in. broad; 5- to 7-ribbed; midrib stout, more or less raised on both surfaces; inner pair of ribs from about .25 in. above the base, strong, acutely angled (about 10° at first) with the midrib and curving upwards to the apex, looped in the upper half, next pair much less conspicuous; outer pair faint or absent; main nerves many pairs, arched between the midrib and first side ribs; reticulations strong, prominent on both surfaces; petiole .3 to .4 in. long. *Cymes* axillary, sessile, many-flowered, reaching 5 in. in length but usually shorter, rusty-pubescent; rachis somewhat angled; bracts small, ovate, acute, ciliate; flowers rather large; buds oblong-obovoid. *Calyx* very small; lobes ovate, acute or obtuse, ciliate, .05 in. long. *Corolla*-tube campanulate, .15 in. long, glabrous without, pubescent within in upper part and with villous tufts at the throat; lobes .1 in. long, recurved, pubescent within. *Stamens* inserted at the top of the tube; filaments short, villous, .025 in. long; anthers oblong, apiculate, .05 in. long, exsert, villous. *Ovary* conical, villous, gradually narrowed into a .15 in. long exsert style, villous below; stigma capitate or obsoletely lobed. *Berry* rather small, reaching .5 in. in length, ovoid; pericarp smooth, crustaceous, thin. *Seed* 1, flat, round.

PENANG: at Penara Bukit, *Curtis* 1021. MALACCA: *Maingay* (K.D.) 1036.

9. *STRYCHNOS PUBESCENS*, Clarke in Hook. f. Fl. Br. Ind. IV. 89 (1883). A large climbing shrub; branchlets rather slender, tawny-pubescent, brown, somewhat striate; nodes swollen, with a ring; tendrils single, circinate, tawny-pubescent, enlarged upwards, 1 to 1·5 in. long, each replacing a leaf in end branchlets or occasionally axillary. *Leaves* yellow when dry, subcoriaceous; ovate, acute at apex, rounded or sometimes attenuate at base, sometimes cordate on ultimate branchlets; upper surface glabrous or puberulous, lower glabrescent when old, pubescent when young; 1 to 3·5 in. long, ·75 to 2·25 in. broad; 3- to 5-ribbed, midrib and ribs conspicuous, strongly impressed above; inner pair of ribs from about ·3 to ·6 in. above the base, starting at about 30°, outer pair at about 45° with the midrib starting from close to the base; main nerves joining them to the midrib arched, about 6 pairs; reticulations obscure; petiole ·1 to ·2 in. long. *Cymes* small, axillary and subterminal, dense, up to ·75 in. in diam., tawny-puberulous to pubescent; bracts lanceolate, small; pedicels short, with 2 bracteoles; buds oblong; flowers white. *Calyx* very small; lobes rounded, ciliate, ·04 in. long. *Corolla*-tube a little longer than the lobes, cylindric, minutely puberulous without, glabrous within; lobes glabrous within, but each with a dense tuft of white bristles at its base; tube and lobes together ·125 in. long. *Stamens* inserted on the middle of the tube, sessile or with minute filaments; anthers ovate, ·025 in. long, apiculate, retrorsely sparsely hairy at base only. *Ovary* glabrous; style very short; stigma capitate. *Berry* globose, ·3 to ·6 in. in diam.; pericarp thin, crustaceous. *Seeds* 1 to 2, flat or concave on one surface, convex on the other, ·5 in. long by ·4 in. broad.

PENANG: *Curtis* 970, 3649. PERAK: at Larút, *Scortechini* 1485; at Relan Tujor, *Wray* 1916; at Thaipeng, *Wray* 3048; at Selama, *Wray* 4278; at Larút, *King's Collector* 2441, 3623, 6276, 6477. MALACCA: *Maingay* (K.D.) 1040; *Curtis* 3494. NEGRI SEMBILAN: at Perhentian Tinggi, *Ridley* 10089. SINGAPORE: at Bukit Timah, *Ridley* 6317.

*Scortechini*, in his notes on his No. 1858, says he thinks that that specimen "shows some differences from *S. pubescens* which may amount to specific distinction; the flowers being pedicellate, the apex of the anthers obtuse, and the style long." No. 1858 is clearly the very last part of a long climbing branch, and such parts often differ a good deal from the more typical parts, so that we are doubtful of its being capable of separation, and prefer to call it:—

VAR. *Scortechinii*, King & Gamble. *Leaves* ovate, acute at apex, rounded at base or almost cordate, densely, softly rusty-tomentose on the lower surface; ribs 3 to 5, starting close to the base. *Cymes* small, axillary. *Stamens* inserted above the middle of the tube of the corolla, not apiculate. *Style* longer than in type. *Berry* oblong.

PERAK: at Dambung Batak, *Scortechini* 1858.



10. *STRYCHNOS RIDLEYI*, King & Gamble, n. sp. A climbing shrub; branchlets slender, terete, nearly black when dry, uppermost only sparsely pubescent; nodes slightly swollen, with a pale line; tendrils single, much circinate, much enlarged upwards, nearly 2 in. long. *Leaves* subcoriaceous, nearly black when dry; ovate or ovate-lanceolate, acute at apex, attenuate or rounded at base; glabrous on both surfaces except for faint tufts in the rib-axils beneath; 1.5 to 3.25 in. long, 1 to 1.75 in. broad; 3- to 5-ribbed, midrib strong, impressed above; inner pair of ribs more slender, from .1 to .2 in. above the base, starting at an angle of about 30° with the midrib, curving upwards to the apex and distantly looped above; near the margin a very faint pair looped and intramarginal; main nerves few, 2 to 3 pairs, straight to the sinuses of the loops of the side ribs; secondary nerves many; reticulations slender, inconspicuous; petiole .3 to .4 in. long, rather stout. *Cymes* axillary, few-flowered, puberulous, reaching .75 in. in length and diameter; peduncles .25 in. long; bracts lanceolate, sheathing, ciliate; bracteoles minute, rounded or acute; pedicels about .05 in. long; buds oblong, black when dry. *Calyx* very small; lobes broad, obtuse, .04 in. long, ciliate. *Corolla*-tube campanulate, .075 in. long, glabrous on both surfaces; lobes as long as tube, glabrous without, densely villous within, and furnished at the base with tufts of pale bristles. *Stamens* inserted at the middle of the corolla-tube; filaments very short; anthers ovate, rounded, .035 in. long, sparsely villous at the base. *Ovary* globose, glabrous, with a short style and capitate stigma. *Fruit* unknown.

SINGAPORE: at Toas, *Ridley* 6313.

This species resembles *S. pubescens* in having the stamens inserted at the middle of the corolla-tube, and in the globose ovary and short style, but the lobes of the corolla are villous within, and the leaves are quite different.

11. *STRYCHNOS TIEUTÉ*, Lesch. in Ann. Mus. Hist. Nat. XVI. 479, t. 23 (1810). A large climbing shrub; branches grey, lenticellate, stiff; branchlets dark brown, slender; nodes somewhat swollen; tendrils single, circinate, much enlarged upwards and at length woody, 1 to 2 in. long, glabrous, replacing an occasional leaf of a pair on ultimate branchlets. *Leaves* chartaceous or subcoriaceous; elliptic or elliptic-lanceolate, bluntly caudate-acuminate at apex, acute or rounded at base; both surfaces glabrous, olive-brown, upper shining; 2.5 to 3.5 in. long, 1 to 1.5 in. broad; 3- to 5-ribbed, midrib slender, impressed above; inner pair of ribs from about .15 in. above the base, prominent, starting at an angle of 40° or less with the midrib and curving upwards to the apex, looped above the middle; outer pair obscure, forming a faint intramarginal looped rib more or less to the apex; main nerves 3 to 6 pairs,

reaching the sinuses of the loops of the inner basal ribs; secondary nerves very many, similar to main nerves; reticulations prominent, irregular; petiole .2 to .3 in. long, curved. *Cymes* axillary, corymbose, usually sessile, reaching 1 in. in length and 1.25 in. in breadth, few- (12- to 18-) flowered; peduncles short; branches of rachis very slender, 3-chotomous; bracts linear, short; bracteoles minute, rounded, 2 to each pedicel below the calyx; pedicels puberulous, .1 to .25 in. long; flower-buds clavate, top rounded; flowers white, sweet-scented. *Calyx* very small; lobes ovate-lanceolate, acute, .05 in. long. *Corolla* infundibuliform; tube slender, .2 to .25 in. long, minutely puberulous without, glabrous within; lobes oblong, .1 in. long, glabrous. *Stamens* inserted at the top of the tube; filaments very short, but decurrent in lines down the interior of the tube; anthers oblong, .05 in. long, apiculate, glabrous. *Ovary* ovoid, glabrous, alternated into a .25 in. long style; stigma capitate, obtuse. *Berry* globose, many-seeded, 1.5 to 2.5 in. in diameter; pericarp thick, woody, shining, smooth, yellowish at first, afterwards red. *Seeds* immersed in pulp, rounded, ovoid or oblong, more or less flattened, usually .75 in. long, and about .25 in. broad; testa thin, silvery; albumen horny; cotyledons cordate, acute, 3- to 5-nerved, .15 in. long; radicle stout, cylindric, as long as cotyledons. Bl. Rumph. I. 67, t. 24; A. DC. Prodr. IX. 13; Miq. Fl. Ind. Bat. II. 380. *S. Maingayi* var. ? *fructuosa*, Clarke in Hook. f. Fl. Br. Ind. IV. 88.

PENANG: *Curtis* 709, 1490; *Ridley* 9358. PERAK: *King's Collector* 5348, 10595. MALACCA: *Maingay* (K.D.) 1038; *Corporal Ali* and *Corporal Hasan*. SINGAPORE: *Ridley*.—DISTRIB. Java (*Horsfield*, *Zollinger*), Borneo (*Beccari* 1580).

*King's Collector*, No. 10311, from Perak, agrees fairly well with *S. Horsfieldiana*, Miq., but the specimens are too incomplete to warrant description.

## 7. GAERTNERA, Lamk.

Trees or shrubs. *Leaves* opposite, rarely ternate, entire, coriaceous, penninerved; stipules connate into a cylindrical sheath. *Cymes* axillary or terminal, many- or 3- to 1-flowered. *Calyx* small, funnel-shaped or campanulate. *Corolla*-tube longer than the calyx; its limb with 4 or 5 lobes; valvate in bud. *Stamens* adnate to the corolla-tube by short filaments. *Ovary* 2-celled; style short or long; stigmas 2, linear or clavate; ovule solitary in each cell, erect. *Berry* didymous, subglobose, crustaceous. *Seeds* often compressed; albumen horny or fleshy; embryo small.—DISTRIB. About 40 species, in the tropics of Asia and Africa.

Leaves glabrous :—

Leaves narrowly elliptic-oblong, usually under 4 in. in length :—

Flowers 4-merous .. .. . 1. *G. viminea*.

Flowers 5-merous .. .. . 2. *G. Koenigii* var. *[oxyphylla]*.

Leaves oblong-oblancheolate, much tapered to the long petiole,

7 to 12 in. in length :—

Cymes densely umbellate, crowded.. .. . 3. *G. obesa*.

Cymes laxly paniculate.. .. . 4. *G. oblanceolata*.

Leaves hairy beneath, elliptic-oblong, slightly narrowed at the base; petiole not very long .. .. . 5. *G. grisea*.

1. GAERTNERA VIMINEA, Hook. f. ex Clarke in Fl. Br. Ind. IV. 91 (1883). A shrub; young shoots as thick as a crow-quill, glabrous. *Leaves* membranous; narrowly lanceolate, apex caudate-acuminate, the base much narrowed; both surfaces brown when dry, the upper glabrous, the lower minutely scaly; length 2·5 to 3·5 in., breadth ·6 to ·8 in.; petiole about ·1 in. long. *Flowers* only about ·25 in. long, in small terminal trichotomous nearly glabrous cymes; lowest bracts linear, sometimes ·4 in. long; pedicels very short. *Calyx* cupular, with 4 spreading teeth. *Corolla* villous at the throat, 4-lobed. *Fruit* obovoid-globose, ·2 in. long. *Psychotria viminea*, Wall. Cat. 8354.

SINGAPORE: Wallich 8354; Ridley 4828, 9500.

2. GAERTNERA KOENIGII, Wight Ic. 1318 (1850); var. OXYPHYLLA, Clarke in Hook. f. Fl. Br. Ind. IV. 91 (1883). A small tree; all parts except the inflorescence glabrous; young branches thicker than a crow-quill, pale brown, terete. *Leaves* thinly coriaceous; narrowly elliptic-oblong, sometimes somewhat oblanceolate, apex shortly caudate-acuminate, base much narrowed; both surfaces pale olivaceous-brown when dry, the lower minutely scaly; midrib distinct; main nerves 6 to 8 pairs, curving upwards, thin but distinct on the lower surface; length 2·5 to 4 in., breadth ·8 to 1·35 in.; petiole ·2 to ·4 in. long. *Stipules* forming an oblong sheath, 5-toothed or bifid, ·25 in. long; the apex and ultimately the whole deciduous. *Panicles* terminal, cymose, lax, less than half as long as the leaves when in flower, elongating in fruit; branches divaricate, opposite, the ultimate branches 3-flowered. *Flowers* ·25 in. long, on puberulous pedicels longer or shorter than themselves, bracteolate near the apex. *Calyx* short, tubular, irregularly 5-toothed. *Corolla* tubular, glabrous outside, slightly curved; the mouth with 5 (sometimes 4) thick spreading subacute lobes. *Stamens* included; anthers linear, slightly bifid at the base, on short filaments. *Ovary* 2-celled, each cell 1-ovuled. *Fruit* globular, ·3 in. in diam., slightly compressed, with a deep vertical groove on each side (subdidymous), glabrous, smooth; the apex areolate, but without remains of the calyx. *G. thyrsoiflora*, Blume

Mus. Bot. Lugd.-Bat. 174; Benth. in Journ. Linn. Soc. I. 112. *G. acuminata*, Benth. *l. c.* *G. Junghuhnii*, Miq. Fl. Ind. Bat. II. 383. *Sykesia Koenigii* and *S. thyrsiflora*, Arn. Pug. Pl. Ind. Or. 35; DC. Prodr. IX. 35. *Psychotria vaginans*, DC. Prodr. IV. 520; W. & A. Prodr. 434. *Psychotria* sp., Wall. Cat. 8342, 8388. *P. oxyphylla* Wall. Cat. 8374; Benth. *l. c.*

PERAK: at elevations over 3000 ft., *Scortechini* 305; *King's Collector* 8063; *Wray* 214, 279, 4113, 4122.

3. GAERTNERA OBESA, Hook. f. Fl. Br. Ind. IV. 92 (1883). A small shrub; young branches compressed, as thick as a swan's quill or thicker, almost glabrous, pale brown, their apices often quite enveloped in the large stipules. *Leaves* subcoriaceous, large; oblong-lanceolate or oblong-elliptic, shortly acuminate at apex, narrowed at the base into the stout winged petiole; both surfaces drying brown, glabrous, the lower minutely lepidote when young; midrib broad; main nerves 9 to 12 pairs, slightly curved, ascending, conspicuous on the lower surface, the intermediate nerves also distinct although thin; length 9 to 12 in., breadth 3 to 3.5 in.; petiole 1 to 1.5 in. long, broadly channelled; its upper part winged. *Stipules* 1.25 to 1.5 in. long, coriaceous, broadly oblong, acuminate when young, but afterwards, from the breaking off of the upper part, blunt or obscurely bifid; the base auricled. *Cymes* (including their peduncles) not much exceeding the leaf-petioles in length, usually terminal, densely umbellate, about 1.25 in. across, bearing about 3 umbellate main branches compressed and puberulous like the peduncle but much shorter, and at the base several linear bracts about .5 in. long. *Flowers* .3 in. long, sessile or shortly pedicelled in short, few-flowered, broadly bracteolate cymelets on the ultimate branchlets. *Calyx* campanulate, puberulous outside; the limb obscurely toothed, entire and truncate, enlarging with age. *Corolla* twice as long as the calyx, fleshy, tubular; the limb with 5 short acute inflexed lobes, glabrous outside, densely hairy in the upper half inside. *Anthers* 5, oblong, blunt, cordate at the base, inserted by short filaments near the base of the tube. *Fruit* unknown. *Psychotria obesa*, Wall. Cat. 8328.

PERAK: *Scortechini*. MALACCA: *Maingay* (K.D.) 925. SINGAPORE: on Bukit Timah, *Ridley* 2680; *Hullett* 118, 137; *Walker* 212.

VAR. *angustifolia*, King & Gamble. *Leaves* not exceeding 2.75 in. in breadth. *Cymes* axillary, 1.5 in. long.

PERAK: *Scortechini*. Only a single specimen collected.

4. GAERTNERA OBLANCEOLATA, King & Gamble, n. sp. A glabrous shrub, 4 to 8 ft. high; branches about as thick as a goose-quill, sub-quadrangular, dark-coloured. *Leaves* subcoriaceous; oblong-oblancoolate, shortly and somewhat abruptly acuminate, gradually narrowed



from above the middle to the short petiole; both surfaces when dry brown, tinged (especially on the paler lower surface) with olivaceous, the midrib prominent on both; the 10 to 12 pairs of curved ascending main nerves prominent on the lower but indistinct on the upper surface; length 7 to 9 in., breadth 1·75 to 3·5 in.; petiole ·6 to 1 in. long. *Stipules* spathaceous, 1·25 in. long, opening on one side, embracing the petiole by a rounded basal wing; the upper part caducous and leaving the irregularly quadrate, persistent, coriaceous, pale, margined base. *Cymes* paniculate, lax, with a few linear deflexed bracteoles, supra-axillary, about 3 in. long (longer in fruit), one-third being peduncle; the branches few, lax, the lower deflexed. *Flowers* in threes, rather crowded towards the apices of the branches, on thick pedicels shorter than themselves, before expansion only about 1 in. long. *Calyx* cylindric; the mouth under ·1 in. in diam., very shortly 5-toothed, glabrous outside like the corolla. *Corolla*-tube twice as long as the calyx, constricted above the middle; the lobes triangular, thick; the throat very hairy inside. *Anthers* hidden amongst hairs; their filaments short. *Ovary* 2-celled, the cells 1-ovuled. *Fruit* glabrous, obliquely obovoid or globular, but somewhat contracted at the base, crowned by the minute remains of the calyx, about ·3 in. in length. *Seed* (by abortion) solitary, with much horny albumen.

PERAK: *Scortechini* 203; *Wray* 1948, 2283; *King's Collector* 8449.

5. GAERTNERA GRISEA, Hook. f. Fl. Br. Ind. IV. 92 (1883). A small bush; young branches as thick as a swan- or goose-quill, compressed, pale, minutely pubescent. *Leaves* coriaceous, large; oblong or elliptic-oblong, apex shortly acuminate, base rounded or cuneate; edges slightly recurved; upper surface glabrous, lower softly pale-cinereous-pubescent; main nerves 8 or 9 pairs, oblique, slightly curved, bold on the lower surface, faint on the upper; midrib broad, prominent on the lower surface (when dry), flat on the upper; length 8 to 11 in., breadth 2 to 4·5 in.; petiole ·35 to ·75 in.; intra-petiolar stipules united to form an adpressed cinereous-pubescent sheath, ·75 in. long, with 1 or 2 apical points. *Cymes* terminal or axillary, solitary, 2·5 to 5 in. long and 2 to 3 in. across, cinereous-pubescent everywhere, on peduncles 1 to 4 in. long, trichotomous and with small triangular bracts at the divisions. *Flowers* ·25 to ·3 in. long. *Calyx* under ·1 in. long, campanulate, with 5 broad, triangular, spreading teeth. *Corolla* ·2 to ·25 in. long, thick, cylindric; limb short, with 5 deep, oblong-lanceolate, valvate lobes with inflexed tips. *Anthers* 5, linear, inserted by short filaments below the glabrous throat. *Style* thick; stigma with 2 broad lobes. *Ovary* 2-celled; ovules numerous. *Fruit* unknown. *Psychotria*?, Wall. Cat. 8389.

JOHORE: *Ridley* 11123; *Murton* 159. SINGAPORE: *Wallich*; *Ridley* 2697.